SOUTHWESTERN JOURNAL OF ANTHROPOLOGY

Published by the University of New Mexico and the Laboratory of Anthropology, Santa Fé, in the interest of general anthropology

VOLUME 16 • NUMBER 3 • AUTUMN • 1960

A Physical Anthropologist's View of the Peopling of the New World — T. D. Stewart 259

Patrilateral Prescriptive Alliance and the Ungarinyin — Rodney Needham 274

A Fresh Approach to the Problem of Magic and Religion — Mischa Titiev 292

The Marriage Network and Structural Change in a North Indian Community — William L. Rowe 299

Analysis of Maize from the Four Bear Site And Two Other Arikara Locations in South Dakota — Hugh Cutler and George A. Agogino 312

Calendar Animals and Deities — David H. Kelley 317

Musical Cartography and the Distribution of Music — Bruno Nettl 338

The Kānya-Kubja Brahmins and their Caste Organization — R. S. Khare 348

Sailing Rafts of Sechura: History and Problems of Origin — Clinton R. Edwards 368

UNIVERSITY OF NEW MEXICO
ALBUQUERQUE

THE SOUTHWESTERN JOURNAL OF ANTHROPOLOGY is designed to include articles in all branches of anthropology relating to peoples and cultures, past and present, in any region. It is offered as a vehicle of expression for anthropologists in all parts of the world.

Manuscripts and other editorial materials should be addressed to the Editor, LESLIE SPIER, University of New Mexico, Albuquerque, New Mexico.

Subscriptions: $4.00 a calendar year (single number, $1.00). Foreign subscription, 1 £ sterling or its equivalent in local currency. Subscriptions should be sent to W. W. HILL, University of New Mexico, Albuquerque, New Mexico. (Remittance should be made payable to the SOUTHWESTERN JOURNAL OF ANTHROPOLOGY.)

Issued in quarterly numbers: Spring, Summer, Autumn, Winter of each year.

Note: The SOUTHWESTERN JOURNAL OF ANTHROPOLOGY is not available for exchange.

Indexed in the *International Index to Periodicals*; abstracted in *Sociological Abstracts*

Microfilm or full-page photographic copies of the SOUTHWESTERN JOURNAL OF ANTHROPOLOGY may be purchased for permanent files by libraries and other subscribers from UNIVERSITY MICROFILMS, 313 N. First Street, Ann Arbor, Michigan to whom inquiries should be addressed.

Printed at the University of New Mexico Printing Plant.

Entered as second-class matter June 17, 1947, at Albuquerque, New Mexico, under Act of Congress of July 16, 1894.

SOUTHWESTERN JOURNAL
OF ANTHROPOLOGY

VOLUME 16 • NUMBER 3 • AUTUMN • 1960

A PHYSICAL ANTHROPOLOGIST'S VIEW OF THE PEOPLING OF THE NEW WORLD

T. D. STEWART

IT is a clear demonstration of man's unique position in the animal kingdom that his ancient migrations from Asia to America can be discerned from such things as plants, stones, melting ice, and the words uttered by his descendants.[1] It is equally a characteristic of this most successful primate that so little of what a physical anthropologist can contribute to the subject is based on the physical remains of the early migrants themselves. Man's success in adapting the products of nature to his needs has frequently been matched by his success in hiding or destroying his dead. At present the few human skeletal remains recovered in this hemisphere under conditions indicating the passage of an impressive amount of time carry us back an uncertain, and probably not a great, distance into the past. Such as they are, these remains are invaluable, because they alone relate directly to one of the fundamental problems with which we are here concerned, namely, the identification of the evolutionary stage reached by the men who first successfully established a beachhead in this hemisphere.

In addition to such direct evidence, certain indirect evidence in the field of physical anthropology offers possibilities for speculation relative to the problem named. For instance, do the descendants of the first American immigrants have physical characteristics that tell anything about the nature of these ancestors? Does our knowledge of human evolution elsewhere help explain what happened in America? I will postpone considering these questions until I have reviewed recent

1 Slightly modified version of a paper read in a symposium at the 58th annual meeting of the American Anthropological Association in Mexico City, December 29, 1959. No criticisms were offered in the discussion. The reference to plants, stones, ice, and words in this opening sentence suggests the scope of the symposium.

opinions and determinations on some of the putatively ancient skeletal remains found in America.

SKELETAL REMAINS

The *Catalogue des Hommes Fossiles,* prepared for the 19th International Geological Congress, contains an American section contributed by the writer.[2] Here are listed seventeen finds which seemed to me then to be of reasonably certain antiquity. Of more recent finds, only the Midland skull from Texas and the skull found at San Vicente Chicoloapan in the Valley of Mexico appear to qualify as additions to the list.[3] If someone else had had the job of making this compilation, undoubtedly the content would have been somewhat different. I felt I was being liberal in admitting so many claimants, but Comas has complained about the omission of certain others.[4] Actually, the size of the list is unimportant in my opinion, because everything turned up so far in America is completely modern in form, even as compared with Upper Paleolithic man of Europe. In Hrdlička's day the modern form of the putatively early remains would have been reason enough for denying them antiquity.[5] Now, however, it is clear that morphology is not a good criterion of age, that the morphology of a specimen becomes useful only when the specimen is dated by other means, and that the only acceptable dating procedure is one which reconciles all of the pertinent cultural, geological, and chemical evidence.

The Midland discovery illustrates this new attitude. In August 1953, after Wendorf had received the fragmented skull and been given an account of its possible Folsom association, he wrote to me requesting that I restore and describe it. In reply I urged him to make more certain of the association before sending me the bones. Excavation soon provided the necessary evidence and ultimately my description of a long-headed Indian type was included in the detailed report by several collaborators which appeared in 1955. At that time a date somewhere between 10,000 and 20,000 years was arrived at by reconciling the evidence of stratigraphy, cultural and faunal associations, the fluorine test and the radiocarbon test. Recently Wendorf and Krieger reported further studies relating to the site and specimens therefrom, including an experimental dating of the bones by the uranium and daughter products technique.[6] From this it seems still possible that the Midland skeleton may be as much as 20,000 years old.

It would take too long for what it is worth to consider all the recent developments in connection with other putatively ancient skeletal remains. With few

2 Vallois and Movius, 1952, pp. 293-306.
3 Wendorf et al., 1955; de Terra, 1959.
4 Comas, 1955, pp. 253-254.
5 Stewart, 1949.
6 Wendorf and Krieger, 1959.

exceptions, the other remains are not so well documented as the Midland skeleton and none has been proved to be older or more primitive. However, since this paper happens to be oriented from Mexico City (see footnote 1), the vicinity of some famous claimants to antiquity, a few words about one of them—Tepexpan man—are in order. Heizer and Cook have just reported new chemical findings on this specimen.[7] They say: "We are definitely of the opinion that Tepexpan man is ancient, and recent intrusion seems clearly to be ruled out." By ancient they mean that the remains belong somewhere in the Upper Becerra formation of the terminal Pleistocene. I have taken the liberty of asking Kenneth Oakley to comment on this conclusion, knowing that he has made independent chemical tests from samples of the same specimens. In this connection he wrote me as follows under date of October 30, 1959: "I shall include the results of our tests on the Tepexpan bones in my book on *Dating Fossil Men,* which I hope to complete in 1960. I would just say this: The results obtained by Cook and Heizer are not inconsistent with the reputed age of the Tepexpan skeleton, nevertheless they are perhaps equally consistent with the view that the latter is a burial of Chalco Age." The Chalco period is usually assigned an age of 6-8,000 years ago. All this simply bears out the point I am trying to make, namely, at present the skeletal evidence from the hemisphere as a whole indicates nothing but the modern form of man going back over a span of about 20,000 years.

Some may still have reservations on the matter of primitiveness owing to the persistence in the literature of the term "Neanderthaloid" in reference to American crania. If so, it is well to remember that the term "Neanderthal" has taken on many shades of meaning in the course of the last hundred years, none of which truly applies to any of the American specimens. "Essentially [an American Neanderthaloid] is a skull of uncertain age but with imputed antiquity resulting from favorable comparison with a 'European Neanderthal'."[8] Actually, no American skull would be mistaken for a true Neanderthal by any qualified paleoanthropologist.[9]

THE LIVING

Let us now turn to the indirect evidence regarding the nature of the earliest Americans, and first of all to the evidence derived from their descendants. Back in 1951, at the 48th annual meeting of the American Anthropological Association,

7 Heizer and Cook, 1959, p. 40.

8 Stewart, 1957.

9 I probably would not have made a statement as positive as this prior to the time (1957) when I restored the Neanderthal skull from northern Iraq known as Shanidar I (Stewart, 1959b). This experience impressed on me the fact that I had never seen anything of the sort among the thousands of aboriginal American skulls I had examined.

I pointed out that since Ulloa first said it in 1772 it has become an adage that he who has seen one Indian may be said to have seen them all, so much are they alike in color and bodily form.[10] Admittedly this statement contains elements of hyperbolism. No one would deny that Indians vary, and especially in such things as stature and head shape, if not much in skin color, hair form, etc. The classifications of von Eickstedt and Imbelloni, and the typologies of Dixon, Hooton, Hrdlička, and Georg Neumann bear witness to this variability.[11] However, recent studies have tended to ascribe less and less of this variability to changes in population heredity wrought in this hemisphere and to attribute it to environment. Thus Marshall Newman has demonstrated for the hemisphere at large that many elements of the Indian phenotype are primarily adaptive responses to environment and are distributed in accordance with Bergmann's and Allen's ecological rules; Hurtado and Monge have shown that in Peru the thin air of high altitude induces a distinctive physical type; and Lasker and Scrimshaw, working in Mexico and Central America-Panama, respectively, have observed that the attainment of growth maxima depends upon the quality of the diet during the ages when growth is in progress.[12] In view of these demonstrations of physical plasticity in certain recent Indians—a trait which they share, of course, with all mankind—the long recognition of a basic phenotypic homogeneity throughout the hemisphere must be regarded as a necessary truth. Indeed, it is safe to say that no population of comparable size has remained so uniform after expanding, in whatever time has been involved, over such a large land area.

On the other hand, a generalization about the genotype akin to Ulloa's adage about the phenotype appears to be in the making. Here, of course, we have practically nothing to go on but blood groups. Leaving out of consideration some northern peoples known to be late comers to the hemisphere (see below), the blood groups of aboriginal Americans are monotonously limited to O, M, and Rh+, to mention only the better known categories. After having typed the bloods of several hundred Indians in the highlands of Guatemala ten years ago for ABO and MN, I was saying to myself, in effect, "Type one Indian and you have typed them all, so much are they alike in their blood groups." Boyd recognized this situation when he classified the American Indians genetically as a separate race, distinct even from the Asiatic mongoloids.[13]

10 Stewart and Newman, 1951.

11 Von Eickstedt, 1933-34, pp. 678-759; Imbelloni, 1958; Dixon, 1923, pp. 393-472; Hooton, 1930, pp. 185-288; Hrdlička, 1931, p. 94 (Hrdlička never summarized his views on Indian types, so this reference is only one sample of his use of the concept); Neumann, 1952.

12 Newman, 1953; Hurtado, 1932; Monge, 1948; Lasker, 1952; Scrimshaw et al., 1955.

13 Boyd, 1950.

Before the middle of this century any such generalization about the American genotype was blocked by reports of high frequencies of blood group B at two points in South America and of even higher frequencies of blood group A in parts of North America. The latter is now accounted for on the basis that it represents a late thrust onto the northern continent of mongoloid groups, notably the Eskimos and Athapascans, with different blood group patterns.[14] Blood group B in South America can now be dismissed on the basis either of White admixture or of faulty serological technique.[15]

While we are considering blood groups it is noteworthy that the Tepexpan and Midland bones have been tested serologically and assigned tentatively to group A.[16] This would seem to upset the claimed genetic uniformity in America, because it conflicts with the finding in living Indians, other than the late comers already mentioned, of an extremely low frequency of A or none at all. However, not all serologists are happy about the blood groups being reported in ancient bones. For example, the Mexican serologist Salazar Mallén has pointed out that sometimes the soil surrounding the bones gives A type reactions.[17] But perhaps the most telling denial of accuracy in the blood typing of ancient bones has come recently from Thieme and Otten who had previously typed the Midland bones.[18] They now see many disadvantages in the antibody inhibition technique being used in the typing and call for the development of more reliable methods. Thus, the ancient bones themselves cannot be trusted yet to show anything different from the existing uniform blood group pattern.

So far I have said nothing about the Diego factor, a serological discovery only five years old. Most of the work on this factor has been done by Layrisse and associates in Venezuela.[19] Partly for this reason, the circum-Caribbean area appears as a center of high frequencies in the distributional pattern thus far revealed. At first, when Diego could not be found in Whites or Negroes, the term "Indian factor" was suggested for it. Then, when Diego still could not be found in Whites or Negroes, including African Negroes, and was not found in Australians and Polynesians, but was found in Chinese and Japanese, it was dubbed "Mongolian factor." Aside from this, the main finding has been a great variability in frequency in closely associated groups, for example, 35% in the Caribs and only 5% in the neighboring Arawak. Lack of uniformity over the area examined and limitation of the positive findings to the mongoloids suggests

14 Boyd, 1951.
15 Lipschutz et al., 1946; Junqueira and Wishart, 1956.
16 Laughlin, 1949; Thieme et al., 1956.
17 Salazar Mallén, 1951; Salazar Mallén and Arteaga, 1953.
18 Thieme and Otten, 1957.
19 Stewart, 1959a.

imperfect sampling and perhaps some unrecognized selection factor. Whether or not this is true, only time will tell. Certainly it is premature to erect on such an insecure basis any hypothesis regarding the peopling of America.

From this brief review it is evident that the genotype of American Indians as represented by the blood groups has come in for much attention lately. Much more could be said about this, and especially about the rarer blood types. However, enough has been said to show that the long-standing impression of genetic homogeneity throughout the hemisphere still has strong support. If this is accepted, along with what has been said about the homogeneity of the phenotype, it constitutes a remarkable phenomenon, which, in view of the sizes of the populations and land masses involved, must have significance as regards the time required for the peopling of the hemisphere.

EXPLANATION OF HOMOGENEITY

The explanation of this remarkable phenomenon depends, in the first place, on the obvious geographical peculiarities of the western hemisphere. It is generally conceded that in ancient times man could have entered this area only by way of what is now called Bering Strait. Also, the main obstacles to man's migration and multiplication within the hemisphere probably were close inside the entrance. Be this as it may, the peopling of America can be described as the filling of a humanly uninhabited and generally attractive cul-de-sac through a relatively inaccessible northern entrance. In other words, the American aborigines constitute a major isolate.

In the second place, the explanation of what happened subsequently to the descendants of the first invaders depends upon the relative actions of the following four agencies regarded by geneticists as being mainly responsible for changes in the genetic character of populations: mixture, mutation, natural selection, and random genetic drift. The fact that the ancestors of the American Indians were not preceded in the hemisphere by a different breed of men is the first point to be noted in this connection. Obviously the only mixture that took place here for many thousands of years was that between groups of much the same genetic make-up. It does not seem likely, therefore, that mixture played a significant role in the development of the American population.[20]

The second agency for population change is gene mutation. Just how important a force this is in human evolution has not been fully established. Curt

20 The possibility of trans-Pacific contacts at a late date does not alter the picture because the number of individuals that could have been introduced by this route would have been too small to have altered the American phenotype or genotype.

Stern says simply that "As a general phenomenon . . . it is very unlikely that the present polymorphism and, even less the polytypy, of man are the result of singular, nonrecurrent mutations." However, he goes on to say that "If mutation from one allele to another occurs recurrently and at numerous loci, most of the single mutations at any one locus will never be established and even none of the many recurrent mutations at any one locus may become established. Some mutations at some loci, however, will escape extinction and may, indeed, even become numerous."[21] Since in any event mutations are simply a source of "newness" in heredity, the utilization of which depends upon the action of the remaining two agencies of population change, selection and drift, let us pass on to them.

"By selection," according to Boyd, "we mean that organisms possessing certain characteristics survive in relatively larger numbers, and leave relatively more offspring, than do other organisms of the same kind possessing other characteristics."[22] In man differential survival—or better, differential fertility—is brought about by all sorts of things, most if not all of which collectively constitute the environment. Thus, for example, disease germs are conditioned as to numbers and varieties by the climate. In turn the disease rates in humans caused by germs depend on the susceptibilities of individuals. And the resulting mortality rates help determine the relative contribution to the next generation by a given set of individuals.

I have chosen this example deliberately because it has special pertinence to the Americas. The cold of the Far North has been characterized as a screen serving in past times to prevent the flow of many pathological germs along with the movements of their human hosts. There is much evidence to support this generalization even in this day of rapid transportation. Apparently the cold screen explains why at the time of the first European contact the Indians lacked many disease entities common to the Old World, and hence were so vulnerable to the diseases introduced by the Europeans and their African slaves.[23] We have only to remember in this connection that smallpox and not Spanish armor was the decisive factor in the fall of Mexico in 1520.

On the other hand, the reduced number of diseases in the prehistoric New World means that disease was less important here as a selective agent than in the

21 Stern, 1956, pp. 588, 589.

22 Boyd, 1950, pp. 140-141.

23 Tuberculosis may be the only identifiable disease carried over into the New World in prehistoric times. A number of cases of vertebral involvement are now on record (see for example, Lichtor and Lichtor, 1957; Ritchie, 1952), but the possibility cannot be ruled out that they represent something else besides tuberculosis; in other words, kyphosis of the spine is not in itself diagnostic of tuberculosis.

Old World. But if disease was not so important, the same cannot be said for most other environmental factors. Just about every kind of climate was present and each had its own peculiar assortment of plants and animals which man could use as foods, some being rich in nutritive values and others poor. In more familiar terms this means tundras, temperate forests, grassy plains, deserts, rain forests, jungles, seacoasts, mountains, etc. In occupying all such environmental niches the American Indians exposed themselves to the selective processes which these habitats exert upon mankind. Today "few serious workers in biology doubt the efficiency of selection in bringing about evolution."[24]

The last of the agencies producing changes in population heredity, random genetic drift, "depends for its operation on the isolation of one small population from other populations with which it could interbreed."[25] According to Stern, "fluctuations in the size of [human] isolates must have been great as the result of famines, epidemics, and wars. During each of these lows in population number, the sample of alleles which passed through the narrow 'bottleneck' of the few parents which connected an earlier, relatively large, with a later, relatively large population, provided a striking opportunity for a demonstration of the effect of drift and often must have resulted in greatly different allelic ratios before and after the bottleneck generation. Similarly, migration of a fraction of a population to a new region constituted opportunities for drift. . . . In other words, the allelic ratios found in the migrants may have deviated considerably from those of the original groups, and, in any case, these ratios may often have undergone great changes during the early generations when the migrated population remained small. Drift in its various aspects," Stern concludes, "probably accounts for much of the polytypy of man."[26]

From what has been said, it stands to reason that the vast and variable spaces which opened up before the first immigrants into the western hemisphere were made to order for the operation of the last two evolutionary agencies or forces we have been considering. Yet, as we have seen, the resulting population is remarkably homogeneous in phenotype and genotype. Even the diseases of this population, with one possible exception, did not proliferate. The exception is syphilis, which may have put in an explosive appearance quite late.[27] Otherwise, the diseases regarded as unique to the hemisphere, such as uta, verruca, and oroya fever, are

24 Boyd, 1950, p. 147.

25 Boyd, 1950, p. 154.

26 Stern, 1956, p. 597.

27 Stewart and Spoehr (1952) suggest that syphilis may have evolved from yaws—a closely related disease—in the Caribbean area just prior to the discovery of America and hence may have been just ready for distribution by the Spanish to susceptible populations in both hemispheres.

of quite limited distribution. All this suggests that the total time involved in the peopling of America was too limited to effect major evolutionary changes. From this point of view, if the first immigrants were not much the same as modern man, or in other words, if they were something like Neanderthal man, I think circumstances would have favored the perpetuation of this more primitive variety; or at least traces of such a variety would have persisted somewhere in the hemisphere. Nothing of the sort has been found.

EASTERN ASIA

Let us now move across Bering Strait and see what evidence has been turned up in eastern Asia regarding the antiquity of the modern form of man. Of course, over the past twenty years and until quite recently circumstances have not been propitious for archaeological work in this area. Unfortunately, also, newer dating techniques, for example the fluorine test, have not yet come into use here. For such reasons attention can be called to only three recent putative early-man finds complete enough to be significant in the present connection. One of these, the so-called Tzeyang man, was found in 1951 in an open site just west of Chungking in Szechuan Province, some 7-800 miles in a direct line southwest of Peking.[28] The fauna said to be associated with the human remains includes the woolly mammoth *(Mammonteus primigenius)* and very likely belongs to the late Pleistocene. Because of this and of the type of the skull, Ju-kang Woo claims that Tzeyang man "... represents an early form of *Homo sapiens,* more primitive than the European Cro-Magnon people and the Upper Cave people of Choukoutien [and thus] is the earliest fossil representative of the Neanthropic stage so far found in China."[29] This claim already has been modified, as will appear. Also, judging from the illustrations, I would say that the skull, which lacks parts of the face and base, could be lost in certain high-vaulted Indian series, for example one from southern Florida.

The second find, so-called Liukiang man, was found in 1958 in a cave near Liuchow in the Kwangsi Chuang Autonomous Region of southern China.[30] In this case the dating of the human remains by means of the associated fauna leaves something to be desired. Although extinct forms, such as *Rhinoceros sinensis* and *Stegodon orientalis* were recovered, more importance is attached to the finding of *Ailuropoda melanoleucus,* the giant panda which still exists in southern China.[31]

28 Woo, 1958.

29 *Idem,* p. 470.

30 Woo, 1959.

31 Colbert, 1938. The present distribution of the pands shown in the map on p. 38 of this article does not include the Kwangsi Region.

This is shown by the following statment by Ju-kang Woo: "As the skull of *Ailuropoda* was found in a site in close proximity to that of the human skull and both were adhered with reddish matrix which is different from the consolidated yellowish deposits yielding the other vertebrate fossils, it seems reasonable to assume that the fossil human skull together with that of *Ailuropoda* are later than Middle Pleistocene. As the fossil human skull is definitely fossilized and of *Homo sapiens* type, it can be assumed that it is of late Pleistocene age."[32] Combining this argument with his observations on the skull, Woo concludes that ". . . Liukiang Man represents an early form of the evolving Mongoloid and is the earliest fossil representative of modern mankind so far found in China."[33] In my opinion the skull type, which is moderately low vaulted with wide, short face, is not very different from that of some California Indians.

The third and most recently reported find, a fragmentary skull cap, is probably much older and certainly more primitive than the other two. This fragment was recovered in 1958 in a limestone cave near the village of Mapa in Kwangtung Province (the province east of the Kwangsi region) in southern China.[34] The list of generic names of the associated fauna includes both recent and extinct forms, so it is difficult to evaluate the dating which is said to be late Middle Pleistocene or early Late Pleistocene.[35] According to Woo and Peng "The most conspicuous features . . . are the supra-orbital tori which, similar to the condition observed in *Sinanthropus*, almost form a continuous cross bar at the base of the forehead. They are separated only by a slight depression in the glabella region, that is to say, fairly distinct torus glabellaris or supranasalis unites the supra-orbital tori of either side. The supra-orbital tori are very thick and project markedly both forward and sidewise. Their upper surfaces merge gradually into the frontal squama with a slight sulcus supratoralis, but not so distinct as in *Sinanthropus*."[36] Although the finding of artifacts is not mentioned, the authors conclude that the Mapa skull ". . . is the earliest human fossil so far found in China with the exception of *Sinanthropus*. This new discovery indicates that in the time of middle Pleistocene, not only North China but also South China are [sic] inhabited by early hominids. Thus it greatly extends the distribution of Paleolithic man in China."[37] It is safe to add that nothing so primitive as this specimen has been found in the western hemisphere.

32 Woo, 1959, pp. 109-110.
33 *Idem*, p. 116.
34 Woo and Peng, 1959.
35 The following faunal list apparently is not complete: *Hyaena, Ursus, Ailuropoda, Felis tigris, Tapirus, Rhinoceros, Sus, Cervus, Bos, Hystrix, Lepus, Stegodon, Paleoloxodon namadicus.*
36 *Idem*, p. 177.
37 *Idem*, p. 181.

Accepting the first two of these new finds as reported and combining them with the three well-known Upper Cave skulls from Choukoutien in northern China,[38] we have evidence of American Indian-like types over a wide area of eastern Asia in late Pleistocene times. In this connection it is important to call attention to Georg Neumann's thus far briefly reported reappraisal of the types of the Upper Cave skulls.[39] Many will recall that Weidenreich thought one of these skulls resembled an Upper Paleolithic European, another a Melanesian, and the third an Eskimo. Typing of this sort, of course, is highly subjective and dependent on the viewer's orientation, so it is not surprising that where Weidenreich, an Old World anthropologist, saw Old World types, Neumann, a New World anthropologist, sees New World types. "All of the traits in question," Neumann says, "appear repeatedly in various early American Indian populations and should be regarded as expressive of the natural variability of the group." Also, it is to be remembered that Melanesians and Australians have been placed in America, quite illogically, on very little more evidence than skull typing.[40] I feel that it is just as unreasonable on this same basis to place Melanesians in north China in late Pleistocene times.

If these newer views have validity—and it would seem that American anthropologists should be the best judges of American Indian skull types—the existence in eastern Asia in late Pleistocene times of varieties of modern man akin to the later Indians may be accepted as reasonably well established. How long they had existed there we still do not know. That these varieties represent the population from which the first Americans were derived seems highly probable, although the point in time at which the separation occurred remains to be discovered.

SUMMARY

In summary, then, the putatively ancient New World skeletons thus far recovered show the presence of only modern man over a period of about 20,000 years. Already before that time related varieties existed in eastern Asia. When the first Asiatics crossed Bering Strait into America, they entered a huge cul-de-sac offering every variety of environment and no forerunners to mix with. A reconstruction of what happened thereafter takes into account that the resulting population at the time of discovery constituted a major isolate that was homogeneous, both phenotypically and genotypically. It is contended that such homogeneity is not consistent with the passage of a long period of time following the establishment of the first beachhead, because the hemisphere offered ideal conditions for the action

38 Weidenreich, 1939.

39 Neumann, 1956.

40 Hrdlička, 1935.

of selection and drift, the two main agencies responsible for genetic changes in populations. It follows from this that the first beachhead was established by modern man.

Bibliography

Boyd, William C.
1950 *Genetics and the Races of Man* (Little, Brown and Co.: Boston).
1951 "The Blood Groups and Types" (in *The Physical Anthropology of the American Indian*, edited by William S. Laughlin, pp. 127-137, The Viking Fund, Inc.: New York).

Colbert, Edwin H.
1938 *The Panda: a Study in Emigration* (Natural History, vol. 42, no. 1, pp. 33-39).

Comas, Juan
1955 *Review of "Catalogue des Hommes Fossiles" edited by Vallois and Movius* (Boletín Bibliográfico de Antropología Americana, vol. 17, pt. 2, for 1954, pp. 252-254).

De Terra, Helmut
1959 *A Successor of Tepexpan Man in the Valley of Mexico* (Science, vol. 129, no. 3348, pp. 563-564).

Dixon, Roland B.
1923 *The Racial History of Man* (Charles Scribner's Sons: New York).

Eickstedt, Egon, Freiherr von
1933-34 *Rassenkunde und Rassengeschichte der Menschheit* (Ferdinand Enke Verlag: Stuttgart).

Heizer, Robert F., and Sherburne F. Cook
1959 *New Evidence of Antiquity of Tepexpan and other Human Remains from the Valley of Mexico* (Southwestern Journal of Anthropology, vol. 15, pp. 36-42).

Hooton, Earnest Albert
1930 *The Indians of Pecos Pueblo: a Study of Their Skeletal Remains* (Yale University Press: New Haven).

Hrdlička, Aleš
1931 *Catalogue of Human Crania in the United States National Museum Collections: Pueblos, etc.* (Proceedings, United States National Museum, vol. 78, art. 2, pp. 1-95).
1935 *Melanesians and Australians and the Peopling of America* (Smithsonian Miscellaneous Collections, vol. 94, no. 11, 58 pp.).

Hurtado, Alberto
1932 *Respiratory Adaptation in the Indian Natives of the Peruvian Andes. Studies at High Altitude* (American Journal of Physical Anthropology, vol. 17, pp. 137-165).

Imbelloni, José
1958 "Nouveaux Apports à la Clássification de l'Homme Américain" (in *Miscellanea Paul Rivet, Octogenerio Dicata*, vol. 1, Universidad Nacional Autónoma de México, pp. 107-136).

JUNQUEIRA, P. C., AND P. J. WISHART
1956 *Blood Groups of Brazilian Indians (Carajás)* (Nature, vol. 177, no. 4497, p. 40).

LASKER, GABRIEL WARD
1952 *An Anthropometric Study of Returned Mexican Emigrants* (Proceedings 29th International Congress Americanists, vol. 3, pp. 242-246).

LAUGHLIN, WILLAM S.
1949 "Preliminary Tests for Presence of Blood Group Substance in Tepexpan Man" (in Helmut de Terra, Javier Romero, and T. D. Stewart, *Tepexpan Man*, Viking Fund Publications in Anthropology, no. 11, Appendix F, pp. 132-135).

LICHTOR, JOSEPH, AND ALEXANDER LICHTOR
1957 *Paleopathological Evidence Suggesting Pre-Columbian Tuberculosis of the Spine* (Journal of Bone and Joint Surgery, vol. 39A, no. 6, pp. 1398-1399).

LIPSCHUTZ, ALEXANDER, GRETE MOSTNY, AND LOUIS ROBIN
1946 *The Bearing of Ethnic and Genetic Conditions on the Blood Groups of Three Fuegian Tribes* (American Journal of Physical Anthropology, n.s., vol. 4, pp. 301-321).

MONGE, CARLOS
1948 *Acclimatization in the Andes. Historical Confirmation of "Climatic Aggression" in the Development of Andean Man* (Johns Hopkins Press: Baltimore).

NEUMANN, GEORG K.
1952 "Archeology and Race in the American Indian" (in *Archeology of the Eastern United States*, edited by James B. Griffin, pp. 13-34, University of Chicago Press: Chicago).
1956 *The Upper Cave Skulls from Choukoutien in the light of Paleo-Amerind Material* (American Journal of Physical Anthropology, n.s., vol. 14, p. 380, abstract 17).

NEWMAN, MARSHALL T.
1953 *The Application of Ecological Rules to the Racial Anthropology of the Aboriginal New World* (American Anthropologist, vol. 55, pp. 311-327).

RITCHIE, WILLIAM A.
1952 *Paleopathological Evidence Suggesting Pre-Columbian Tuberculosis in New York State* (American Journal of Physical Anthropology, n.s., vol. 10, pp. 305-318).

SALAZAR MALLÉN, M.
1951 *Estudio Immunológico de Restos Óseos Antiguos* (Gaceta Médica de México, vol. 81, pp. 122-128).

SALAZAR MALLÉN, M., AND CONSUELO ARTEAGA
1953 *Resultados y Crítica del Procedimiento para Determinar el Grupo Sanguíneo de Restos Óseos Antiguos, Sistema ABO* (Memoria del Congreso Científico Mexicano, Universidad Nacional Autónoma de México, vol. 12, Ciencias Sociales, pp. 140-142).

SCRIMSHAW, NEVIN S., MOISÉS BEHER, CARLOS PÉREZ, AND FERNANDO VITERI
1955 *Nutritional Problems of Children in Central America and Panama* (Pediatrics, vol. 16, pp. 378-397).

STERN, CURT
1956 *Principles of Human Genetics* (W. H. Freeman and Co.: San Francisco).

STEWART, T. D.
1949 *The Development of the Concept of Morphological Dating in Connection with Early Man in America* (Southwestern Journal of Anthropology, vol. 5, pp. 1-16).
1957 *American Neanderthaloids* (Quarterly Review of Biology, vol. 32, pp. 364-369).
1959a [General Statement on] *Physical Anthropology* (Handbook of Latin American Studies, no. 21, pp. 37-38).
1959b *The Restored Shanidar I Skull* (Smithsonian Report for 1958, pp. 473-480).

STEWART, T. D., AND ALEXANDER SPOEHR
1952 *Evidence on the Paleopathology of Yaws* (Bulletin of the History of Medicine, vol. 26, pp. 538-553).

STEWART, T. D., AND MARSHALL T. NEWMAN
1951 *An Historical Résumé of the Concept of Differences in Indian Types* (American Anthropologist, vol. 53, pp. 19-36).

THIEME, FREDERICK P., AND CHARLOTTE M. OTTEN
1957 *The Unreliability of Blood Typing Aged Bones* (American Journal of Physical Anthropology, n.s., vol. 15, pp. 387-397).

THIEME, FRED P., CHARLOTTE M. OTTEN, AND H. ELDON SUTTON
1956 *A Blood Typing of Human Skull Fragments from the Pleistocene* (American Journal of Physical Anthropology, n.s., vol. 14, pp. 437-443).

VALLOIS, HENRI V., AND HALLAM L. MOVIUS, JR.
1952 *Catalogue des Hommes Fossiles* (Extrait du Fascicule V des Comptes rendus de la XIX[e] Session du Congrès Géologique International, 320 pp.).

WEIDENREICH, FRANZ
1939 *On the Earliest Representatives of Modern Mankind Recovered on the Soil of East Asia* (Peking Natural History Bulletin, vol. 13, pt. 3, pp. 161-174).

WENDORF, FRED, AND ALEX D. KRIEGER
1959 *New Light on the Midland Discovery* (American Antiquity, vol. 25, pp. 66-78).

WENDORF, FRED, ALEX D. KRIEGER, AND CLAUDE C. ALBRITTON
1955 *The Midland Discovery. A Report on the Pleistocene Human Remains from Midland, Texas* (University of Texas Press: Austin).

WOO, JU-KANG
1958 *Tzeyang Paleolithic Man–Earliest Representative of Modern Man in China* (American Journal of Physical Anthropology, n.s., vol. 16, pp. 459-471).

1959 *Human Fossils Found in Liukiang, Kwangsi, China* (Vertebrata Palasiatica, vol. 3, no. 3, pp. 109-118 and 3 pls.).

Woo, Ju-kang, and Ru-ce Peng

1959 *Fossil Human Skull of Early Paleoanthropic Stage Found at Mapa, Shaoquan, Kwangtung Province* (Vertebrata Palasiatica, vol. 3, no. 4, pp. 176-182 and 1 pl.).

United States National Museum
Washington, D. C.

PATRILATERAL PRESCRIPTIVE ALLIANCE AND THE UNGARINYIN

RODNEY NEEDHAM

THE AIMS of this note are: (1) to pursue the problem of the formal analysis of patrilateral prescriptive alliance; (2) to make an analysis of Ungarinyin society with reference to a recent argument in which it is proposed that this society may exemplify a hypothetical patrilateral alliance system.

I

The theoretical theme is the comparative analysis of systems of prescriptive alliance[1] as social systems characterized by the various ways in which lineal descent groups may be allied by the exchange of women between them.

There are two basic modes of prescriptive alliance: symmetric, in which there is direct exchange between groups, and characterized by prescribed marriage with a bilateral cross-cousin; and asymmetric, in which groups are allied through the unilateral transfer of women by prescribed marriage with the matrilateral cross-cousin. It has also been thought that there is a third type of system, based on exclusive marriage with the patrilateral cross-cousin, and involving a mode of exchange which has been described as "alternating" or "discontinuous."

Researches in the field and analyses of the existing literature have elicited fairly clearly the general features of symmetric and of asymmetric alliance. There is as yet no satisfactory field study of either system, but at least it is certain that societies practicing such modes of prescriptive alliance do exist. The case is very different, however, with the supposed system of patrilateral alliance. Some time ago I wrote an article bringing together the various views advanced by anthropologists on this type of society, and examined the issue afresh.[2] On the basis of a purely formal analysis I concluded theoretically that such a system of prescriptive alliance could not exist at all. I then examined the literature on a

1 In an earlier publication (Needham, 1958a) I coined the term "prescriptive marriage system" as a generic designation, and adopted the Durkheimian and Dutch usage of "connubium" to refer to the type of affinal relationship maintained between lines in such systems. The terms used here seem to me to be preferable.—I must apologize for using different technical terms in publications on the same theme; but it is only as I slowly come to appreciate the theoretical issues, and learn what distinctions are analytically necessary, that I can select appropriate terms to deal with them. (Other considerations also enter: e.g. the term "circulating connubium"—to designate asymmetric alliance—seemed apt, if cumbersome, until a colleague professed to see in it a gigantic double bed, slowly revolving.)

2 Needham, 1958b; see also the note of correction in Man, vol. 59, 1959, p. 86.

number of societies which, it had been claimed, exemplified this form of social system, together with certain others selected from the major ethnographic areas of the world, and concluded also that a patrilateral system did not in fact exist. It could well have been that my formal analysis was mistaken, but it was surely a matter of considerable importance that no society actually practicing this mode of alliance could be discovered.

It has since become clear to me that my analysis was an unsatisfactory piece of work, on a number of counts;[3] but I remain sure that its conclusion is correct. Further reading and enquiry, also, has failed to disclose any society anywhere in the world which clearly practices, or may reasonably be supposed to practice, patrilateral prescriptive alliance.

The issue has now, however, been taken up again by Livingstone, in an article in which he maintains (a) that my formal analysis is mistaken, and that such a system "can very well exist," and (b) that an Australian tribe, the Ungarinyin, possibly exemplify this system in practice.[4] If he is right his argument has certain important theoretical consequences. In the present note, therefore, I wish to examine these two contentions.

II

I do not intend to examine in detail Livingstone's article as a whole, but it has certain general features which have to be taken into account. The first is the puzzling fashion in which empirical matter is introduced into what is professedly a "completely formal analysis." Livingstone writes that his paper attempts "a further analysis of prescriptive marriage systems in Australia"; but if it is indeed to be completely formal, then it is inappropriate to locate the systems he considers as "among the Australian aborigines." It would of course be reasonable to select certain Australian tribes as illustrating types of system arrived at on purely theoretical grounds, but Livingstone does not do this consistently. For example, he presents a diagram (his Fig. 3) of a system combining matrilateral cross-cousin marriage and exogamous moieties, and relates it to "some anthropologists' conception of the Murngin marriage system"; but he immediately disclaims any intention of citing the Murngin as an actual substantive illustration of his theoretical construction, saying that he merely wishes to show that this is a possibility, "whether or not any Australian society actually practices prescriptive matrilateral cross-cousin marriage."[5] But if the analysis is really to be completely formal, why

3 I intend eventually to recast and amplify it. Meanwhile, the present note may supply some of its deficiencies.

4 Livingstone, 1959.

5 An actual example of this type of alliance, though without the four sections, will be found in my analysis of Aimol society (Needham, 1960a).

bring in the Murngin unless they constitute a definite and illuminating exemplification of the formal construct? And since in any case there has been considerable discussion about the correct interpretation of the Murngin ethnography, and since Livingstone declines to be involved in such controversy, why introduce these substantive considerations at all?

Another example of the same sort, and nearer to the concern of this note, relates to Ungarinyin society, which Livingstone cites as a possible exemplification of the patrilateral system diagrammed in his Fig. 5. He adduces evidence which, he maintains, supports the possibility that their social system is of the type posited; but he declines to consider evidence against this possibility, on the ground that his paper "is not an attempt to prove that this tribe does have such a system."[6] But he cannot have it both ways. Either his analysis is formal, in which case a purely theoretical consideration of a hypothetical system is all that is called for, or it is substantive as well and is capable of empirical demonstration. In the latter case, either the Ungarinyin constitute such an example or they do not, and to cite them as a "possibility" is justified only if all the evidence is examined and if it then clearly appears that they may be so organized. What is quite inadmissible, however, is to cite only those facts which, it is claimed, support the proposition, while declining to examine facts which do not.

The other general feature to which I would draw attention is the uncertain extent to which Livingstone's constructs are intended to be taken as novel. His representation of the Kariera type of system (his Fig. 1) is, he would agree, a commonplace; that of the Arunta type (his Fig. 2) is structurally identical with Radcliffe-Brown's;[7] that represented in his Fig. 3, the combination of exogamous moieties and matrilateral cross-cousin marriage, is in principle the same as in a diagram by Leach;[8] and so is that in his Fig. 4, for it would be absurd to suppose that Leach would not have known where to place the unrepresented females in the lines of his diagram, or to which lines to attach those that are represented, if his argument had called for such a replete figure.[9] This leaves with any claim to novelty only the last type of system that Livingstone isolates, viz. a "prescriptive patrilateral cross-cousin marriage system," represented in his Fig. 5. I now turn to the examination of this hypothetical system.

First, whatever the degree of novelty in the diagram itself, the construct is not basically a theoretical discovery. Three of the societies referred to in my

6 Livingstone, 1959, p. 371.

7 Radcliffe-Brown, 1931, facing p. 50.

8 Leach, 1951, p. 33.

9 As Livingstone seems to imply in his footnote 7. If this is not implied, he cannot claim—as he does—to have "gone a step farther" than Leach.

article, viz. the Haida, Tlingit, and Sherente, are divided into exogamous moieties and also distinguish terminologically between father's sister's daughter and mother's brother's daughter; while the patrilineal Sherente even permit marriage with the former and forbid marriage with the latter. It cannot reasonably be thought, therefore, that in writing that article I was ignorant of the possibility of existence of societies with these structural features. Whether they could fit Livingstone's diagram, however, is an entirely different matter.[10]

This brings me to the question of the value which Livingstone attaches to his diagrams. It is a general feature of his paper, not only of the part relating to the patrilateral system, that he confuses what Leach (in an essay which he cites) has usefully distinguished as "descent lines" and "local lines." One of the most valuable lessons of Leach's examination of the structural implications of matrilateral cross-cousin marriage is—though phrased in a rather extreme form—that "descent lines have nothing whatever to do with local grouping," and that "serious misunderstandings have constantly arisen from a tendency to confuse structural diagrams with ethnographic reality."[11] Livingstone, however, in his argument and in his diagrams identifies descent line with local line. He begins by presenting his assumptions about "the nature of the local group," and goes on to consider different systems according to the "number of different kinds of local group" and the exchange relations between them. But when he diagrams these systems the number of "kinds" of local group is directly pictured by the number of descent lines distinguished. Thus his Fig. 4 is described as showing "four different kinds of local group"; whereas Leach, precisely in demonstrating what confusion may result from failure to distinguish descent line and local line, points out that in a system of this sort relatives separated in two descent lines of a diagram may be members of the same local group.[12]

Further on this point, we should note what Livingstone means by "different kinds" of local group. By definition they are local groups of co-resident, patrilineally-related males, and in these respects they are groups of the same kind. The differences between them lie only in their section-composition; but it is in no way *a priori* necessary that groups of different section-composition shall be different local groups. (This is indeed the case among the Kariera, for instance, but to derive this feature from this or any other particular society introduces a matter of contingent fact which has no place in a formal analysis.) This confusion has the consequence of making it impossible to "derive" the possible types of alliance

10 How Sherente society may best be understood is an exercise that I hope to present in a future paper.

11 Leach, 1951, pp. 25, 27.

12 *Idem*, p. 33.

system, as Livingstone claims to do, from the permutation of the numbers of different kinds of local group and the rules of exchange. Even if "descent line" were substituted for "local group," however, it would be uncertain what relation Livingstone would infer between his constructs and existing or socially possible societies in Australia.

I adduce these considerations partly in order to determine the degree of analytical exactitude in Livingstone's argument; but more particularly in order to be in a better position to understand what he intends to convey by his diagram of a patrilateral system, and how it relates to my earlier argument. The issue is presented in these words: ". . . The system shown on Figure 5 fulfills all the requirements of a prescriptive patrilateral cross-cousin marriage system and *hence* can very well exist."[13] But from the fact that it is possible to draw a diagram of a a social system it does not at all follow that the social life of any people can be so organized. My own diagram[14] also represents a hypothetical patrilateral system: it is self-consistent; it forms a closed system; and it contains the same number of lines, structural positions, and relations as the minimal diagram of an asymmetric system,[15] a system which does exist and whose characteristic features structurally correspond to certain features of the diagram by which it is represented. It cannot, however, be inferred, on these grounds, that such a patrilateral system can therefore exist; for the issue is not whether a diagram to show patrilateral alliance can be constructed, but whether a theoretical system founded on an exclusively patrilateral prescription is *socially possible*. The point of the argument which Livingstone believes himself to have refuted was that, when one got down to looking at what my diagram would mean in terms of the social lives of people on the ground, the system appeared to be unworkable, socially impossible. This conclusion is not refuted simply by drawing a rather different diagram. Nor can the new diagram be validated merely by imagining that an eight-section system, which is based on certain constant alliances between sections, changes these alliances to a quite different scheme. This is a proposition which requires detailed demonstration. I do not, however, wish to tackle the question of whether such a change is possible: it would not, either way, affect the present argument; and at this point I am concerned rather with Livingstone's method of argument than with such technical questions.

The central difficulty in the working of a system of "discontinuous exchange" is the feature of alternation of alliance-status between lineal descent groups. In the hypothetical three-line system any line has to function *as a corporate group*

13 Livingstone, 1959, p. 369; my italics.
14 Needham, 1958b, p. 207, fig. 2.
15 Needham, 1958a, p. 76.

alternately by generations as wife-givers to another line and as wife-takers from that line. Moreover, it has to be remembered that it is not only women who supposedly are transferred in such a fashion, but that in an alliance system women form one item in a whole system of prestations, economic and ritual. In the only known type of unilateral alliance system (viz. the matrilateral) these prestations are commonly grouped into complementary classes, being transferred constantly, not only at marriages, and in opposite "directions." If alternation were a fact, the operation of the entire system of prestations also would have to be reversed in every generation in accordance with the affinal alternation. (This can be argued in detail at great length. For the moment I would urge the reader to consider what such alternation would mean for the Purum.) I argued that the only conceivable way of effecting this alternation as a practical social arrangement was by means of a section-system in which proximate generations would belong to different sections; but it was directly seen that no system comprising a multiple of three sections (to accord with the three lines) could satisfy the conditions of the hypothetical alliance system. It was from this point that I proceeded to the demonstration that the supposed system of three lines reduced itself inevitably to a two-section system.

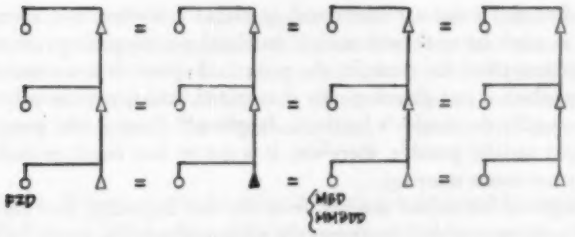
But Livingstone does not mention this aspect of the problem, and he gets round the difficulty about conventional genealogical levels by proposing a form of eight-section system, one in which the woman who is married can be characterized genealogically as father's sister's daughter but not as mother's brother's daughter. This procedure is open to a number of objections. The first is that nearly all the societies which have been supposed to practice patrilateral cross-cousin marriage, and which have been subjects of argument in this connection, are known not to have eight-section systems, so the proposed scheme cannot apply to them; while the distribution and social organization of societies which do have eight sections is fairly well known, so that the chances of it applying to them are small. The problem has usually been posed, and most importantly by Lévi-Strauss, in the framework of a society without an eight-section system, and to adopt Livingstone's proposal is at once to place severe limitations on the investigation and on the possibility of a general solution. Further, since the problem has been how to conceive patrilateral alliance, i.e. how to secure the supposed alternation by generation, in a society without an absolute differentiation of genealogical levels, Livingstone's assumption of the existence of eight sections, which entail such differentiation, does not solve the problem but nullifies it. He could still claim, of course, that these considerations do not affect his argument that a patrilateral system of this particular sort is possible, no matter how rare its occurrence; and that his proposal does not preclude the possibility of there existing another fea-

sible type of patrilateral system; and it is in fact on more radical grounds that he must be shown to be mistaken.

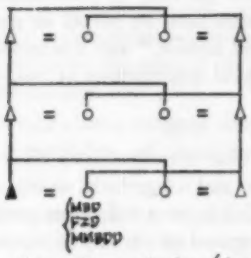
The question now is: In what sense is the spouse in Livingstone's Fig. 5 a "patrilateral cross-cousin"? Here one has to refer to the definition of the other two types of cross-cousin, with which the patrilateral is contrasted, and to typical alliance systems in which they figure. The key point is the equation in Livingstone's diagram of father's sister's daughter and mother's mother's brother's daughter's daughter. Now in an asymmetric (matrilateral) system, to begin with, this equation cannot be made (Fig. 1a). In this system, not only is FZD genealogically distinct from MBD, but it is the latter who is equivalent to MMBDD: that is, MMBDD is opposed to FZD as matrilateral to patrilateral cross-cousin. Secondly, in a classical two-section system (Fig. 1b) FZD is structurally equivalent to MBD, i.e. the prescribed spouse is the bilateral cross-cousin, and this relative is also MMBDD. Thirdly, in a three-line patrilateral system (Fig. 1c) of the sort postulated in my paper, FZD is distinct from MBD but is nevertheless structurally equivalent to MMBDD; i.e. she is a bilateral relative, which was precisely the point of my argument.[16] The upshot of these comparisons is that, in terms of laterality of prescription, there are in this respect not three but only *two* kinds of cross-cousin with whom marriage can be prescribed: the matrilateral (in an asymmetric alliance system) and the bilateral (in symmetric systems and in a hypothetical patrilateral system). In the former system, patrilateral and matrilateral are structurally quite distinct; in the latter, whether or not a genealogical distinction is made, the prescribed cross-cousin is necessarily a bilateral relative. (The argument can be pressed in respect of other genealogical specifications and other systems, but this suffices.)

If we now turn back to Livingstone's diagram it can be clearly seen that the prescribed spouse, in this proposed patrilateral system also, is a *bilateral* cross-cousin. It is true that genealogically she cannot be the mother's brother's daughter, but this consideration has no force in the characterization of the alliance system. Her parents and her husband's parents are first cross-cousins, and she herself is Ego's cross-cousin, one who is genealogically both patrilateral (as FZD) and matrilateral (as MMBDD). It can only be claimed that the spouse really is exclusively a patrilateral cross-cousin if the term "cross-cousin" is limited to first

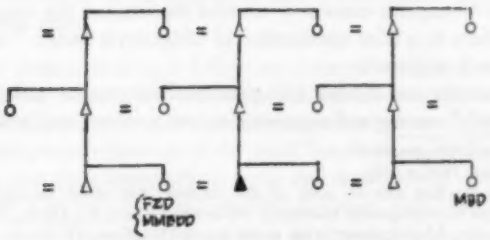
16 Livingstone could justly charge me with ambiguity in using the shorthand of "MBD" and "FZD" at this point in my paper (though see 1958b, p. 201, fn. 11), instead of the lengthy but more exact terms "matrilateral cross-cousin" and "patrilateral cross-cousin." The structural import of my argument is nevertheless certain, for the final reduction I proposed was to a "two-section system," in which the genealogical relationship of an individual cross-cousin may be more distant than MBD or FZD.



1a: Asymmetric



1b: Symmetric (two-section)



1c: Hypothetical patrilateral

FIG. 1. Cross-cousins and alliance systems.

cousin; but this is not a conventional or useful limitation, and alliance systems do not in any case work with such a restricted genealogical specification. In an asymmetric system, for example, the prescribed spouse is a woman of a certain category which is not genealogically determined, and it may be only rarely that she is actually the mother's brother's daughter.[17] Even if the proposed system is thought socially possible, therefore, it is not in fact based on exclusive patrilateral cross-cousin marriage.

Livingstone has indeed ensured, from the very beginning, that the spouse prescribed in his system shall be necessarily a bilateral relative, simply by his assumptions that the total social system within which exchange takes place is divided into patrilineal exogamous moieties, and that these are themselves divided into sections.[18] Once these assumptions are made, it does not matter whether the system has four or eight sections, or how the class of cross-cousins may be divided by sections, or what genealogical restrictions are placed on marriage: in every case the prescribed spouse is a bilateral relative,[19] and it is impossible to determine an alliance category whose genealogical specifications as cross-cousin shall be exclusively unilateral.

III

It remains now to be seen what correspondence there may yet be between Livingstone's hypothetical system and Ungarinyin society, which he claims as a possible exemplification of it. This is not a redundant exercise, for two reasons: (a) my formal analysis of the proposed system may be mistaken, and the empirical demonstration of this would lie in the discovery of a society which was in fact so organized; (b) it constitutes an illuminating exposure of Livingstone's argumentation, and contributes to a clearer evaluation of his paper. I disregard his defence against contrary evidence: he suggests the Ungarinyin as a "possibility," and it is my proper and inescapable concern to examine the force of this suggestion. I now proceed, therefore, to a brief examination of Ungarinyin society[20] in comparison with Livingstone's argument.

The Ungarinyin are divided into patrilineal exogamous moieties; the local group is a "horde" owning and occupying its own territory, and persons born into

17 Needham, 1958a, pp. 81-83.

18 Livingstone, 1959, p. 362.

19 Compare the fact that so many of the societies from which patrilateral cross-cousin marriage is reported have exogamous moieties or two-section systems, e.g. Haida, Tlingit, Sherente, Maria Gond, Kandyu, Mudukulattur in my earlier survey (Needham, 1958b).

20 I undertake this with some trepidation, because it seems useful and necessary, not because I imagine myself competent in the specialized field of the comparative study of Australian societies. I think I can make some effective points concerning the particular matter at issue, but I am very ready to be corrected in my interpretation by an expert in this field.

one local group form a patrilineal exogamous "clan"; their descent system is based on the recognition of four lines of descent, viz. those of father's father, mother's father, mother's mother's brother, and father's mother's brother.[21] To examine the further features of this system, the most effective procedure at this point is to quote Livingstone's characterization of it,[22] together with the evidence to which he refers:

(1) Livingstone: "Marriage with the father's sister's daughter may be prohibited";
Radcliffe-Brown: "The system prohibits marriage with first cousins, i.e. with mother's brother's daughter or father's sister's daughter";[23]
Elkin: "Marriage with [first] cross-cousins is prohibited."[24]

(2) Livingstone: "The Ungarinyin do *not* have direct exchange";
Radcliffe-Brown: "The system does not permit the exchange of sisters, but this applies only to own sisters, not to classificatory or tribal sisters. Thus a man could not marry the sister of his sister's husband, but could marry a woman from the same clan";[25]
Elkin: ". . . Two men cannot exchange sisters in marriage";[26]
". . . The impossibility of marriages with . . . sister's husband's sister."[27]

(3) Livingstone: "The prescribed marriage is father's mother's brother's son's daughter";
Radcliffe-Brown: "It [the system] would seem to permit marriage with the father's mother's brother's son's daughter";[28]
Elkin: "There is only one second-cousin marriage which is common to the Aranda and Ungarinyin systems, namely with father's mother's brother's son's daughter."[29]

I shall take up these matters again below: my concern here is to show how Livingstone interprets the sources and in what fashion he conveys their evidence. I content myself for the moment with the following observations on these respective points. (1) Livingstone's insertion of the word "may" creates in the reader's mind the impression that the ethnography is vague and that it leaves room for the possibility that the Ungarinyin do not prohibit marriage with the father's sister's

21 Radcliffe-Brown, 1931, p. 337; Elkin, 1932, p. 312; 1948, p. 67.
22 Livingstone, 1959, p. 371.
23 Radcliffe-Brown, 1931, p. 337.
24 Elkin, 1932, p. 312.
25 Radcliffe-Brown, 1931, p. 338.
26 Elkin, 1932, p. 315.
27 Elkin, 1948, p. 68.
28 Radcliffe-Brown, 1931, p. 338.
29 Elkin, 1932, p. 313.

daughter, and that hence this society may still fit his diagram. (2) Sisters in this context are "own," not classificatory, as Radcliffe-Brown clearly says; and it is perfectly possible for two men to be prohibited directly to exchange sisters (which is all we are told) and yet for the general exchange of women between alliance groups to be direct. That is, a prescriptive rule of marriage may be subject to genealogical qualification. The probability, it seems to me, is that this is not so among the Ungarinyin; but Radcliffe-Brown's assertion stands as the only explicit evidence on this point, and any other conclusion is uncertain inference. (3) Neither source cited permits the assertion that marriage with the father's mother's brother's son's daughter is "prescribed." To say that the Ungarinyin practice one kind of marriage in common with the Aranda is not to say that no other kind is permitted; and it is misrepresentation of the evidence to say that the wife is prescribed by this particular genealogical specification when (as we shall see) the ethnography says quite clearly that this is not so.

Livingstone further maintains that "the marriage system shown on Figure 5 accords with all these statements about the Ungarinyin system"; but this is extraordinary, for it is obvious that his diagram prescribes marriage with the father's sister's daughter, whereas even his own account of the evidence makes this at least unlikely for the Ungarinyin. In fact, the ethnography shows, by this single point, that the Ungarinyin system does not accord with Livingstone's diagram.

Another feature of his diagram is that it represents an eight-section system. His second and third assumptions are indeed that every system he presents shall be a four- or eight-section system and that the marriage rules shall apply between the sections.[30] But the evidence is quite clear that Ungarinyin society has neither four nor eight sections. Elkin even explicitly says that "it would really be impossible to apply the [four-]section system to the Ungarinyin terms. . . . Likewise, the sub-[sc. eight-]section system would be of no value. . . ."[31] Livingstone seems to acknowledge this when he writes that "even if the Ungarinyin do not have a section system . . . the practice of father's mother's brother's son's daughter marriage and indirect exchange would result in a situation similar to that shown on Figure 5."[32] But if there are no more than the moieties in this society then the

30 Livingstone, 1959, p. 362.

31 Elkin, 1932, p. 317.

32 This is rather ambiguously phrased: the form "even if" leaves grammatically the possibility that the Ungarinyin may or may not have the eight sections. The form "even though" would more correctly convey the indisputable fact that they do not. But there is a puzzle here. Livingstone thinks that his system is the only one the Ungarinyin could have *"if"* their social system meets his initial assumptions; but on the crucial issue of sections (cf. his second assumption) the ethnography permits no doubt. On the other hand, it is difficult to see how Livingstone could have made his suggestion about Ungarinyin society if he had appreciated this.

Ungarinyin system cannot be derived from his premises; and furthermore we are again confronted with all the difficulties attendant upon the supposed alternation, and this is a problem which Livingstone ignores.

The final means of testing Livingstone's suggestion about the Ungarinyin is of course to try to apply the relationship terms of this society to his diagram. They follow:

1. *nolingi* FF, eB, WBDH, WFZH
2. *wolmingi* WMF, WFM, WMB, WM, WBW, ZDH, ZDC, WBSW
3. *maringi* FM, FMZ, FMBD, FMSD, FMBSSD, WMM, W, WBD, WFZ, SSD
4. *ngadji* MFZ, M, MBD, SW
5. *kandingi* MF, MB, MBS, MBSS, MBSSS
6. *kaiingi* MM, MBW, MMB, MMBS, MMBSD
7. *waiingi* FMB, WFF, WF, WB, WBS
8. *idje* F, S, MBDH
9. *amalngi* FFZ, FZ, D
10. *wuningi* FFZH, FZH, ZH, DH, ZSC, MMBW, MMBSW
11. *malengi* FFZS, WMBW, FZS, FZD, ZS, ZD, DC
12. *lalingi* Z
13. *mariengi* ZSW, FFZSW.[33]

Applying these terms to Livingstone's scheme, the result is as in Fig. 2. The genealogical apparatus of his diagram is replaced by simple compartments representing the same structure; the terms themselves are represented by their numbers in the above list. It is at once apparent that they do not fit the proposed system in any consistent or comprehensive or plausible way, and not at all according to the general fashion of prescriptive alliance systems.[34] It can easily be checked, too, that they cannot be fitted to my patrilateral diagram of three lines.

33 Elkin, 1932, pp. 300-301, 313-316; 1948, pp. 67-70.—Lévi-Strauss, writing of a reported equation of father's sister with father's mother among the Arabana, says that "un usage du même type existe toujours chez . . . les Ungarinyin" (Lévi-Strauss, 1949, p. 252); but this is not the case, and could not possibly be in such a system. More generally, he also states that a "consecutive nomenclature" is diagnostic of matrilateral cross-cousin marriage and an "alternating nomenclature" of patrilateral, suggesting that these features are valuable for establishing a preliminary classification of systems. He refers to the Ungarinyin in this respect as having a consecutive nomenclature (*idem*, p. 276); but it is evident (see Fig. 3) that the Ungarinyin terminology is of both types, consecutive in some lines, alternating in others. See further below on the concomitant rule of marriage.

34 Cf. Leach, 1954, p. 305; Needham, 1959, 1960a, 1960b.

It is a characteristic feature of a prescriptive alliance system that its relationship terms, and the way in which they are ordered by the constant relations of the exchange system, can be represented in one integrated diagram; and even when a structural position is denoted by more than one term this fact is easily interpreted by reference to the distinctive rules of the particular system. Now it is revealing that when Elkin (the ethnographer on whose evidence we rely) wishes to present

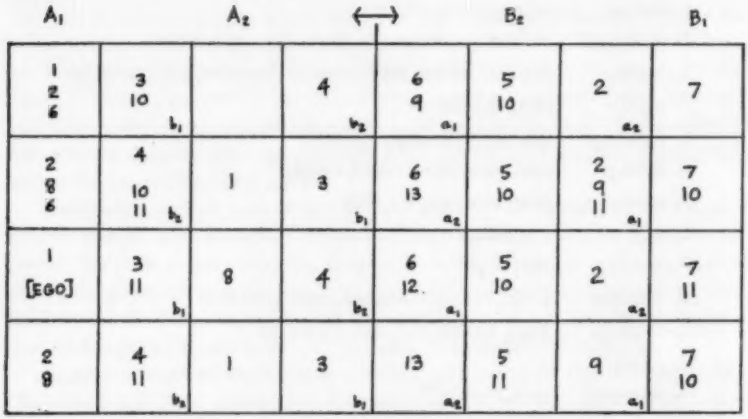


FIG. 2. Ungarinyin terms ordered as in Livingstone's scheme.

the terms in a genealogical form he does so in two separate diagrams.[35] The reason is that there is no integral way in which the terms can be ordered as a prescriptive alliance system except according to the dual division of the two moieties (Table 1). In fact, it is only in this minimal respect that Ungarinyin society can be regarded as a prescriptive alliance system at all. Radcliffe-Brown indeed draws one's attention to this fact by likening the Ungarinyin system to that of the Yaralde, of which he says: "As compared with normal Australian systems the Yaralde have adopted a different method of regulating marriage. There is no longer a simple rule that a man must marry a woman who stands to him in a particular relationship. Outside the range of his own nearer kin there are women who are sufficiently distant from him to become his wife's mother, and from any of these he may obtain a daughter to be his wife."[36]

35 Elkin, 1948, pp. 69-70.

36 Radcliffe-Brown, 1931, pp. 224, 454-455.

The Ungarinyin system may best be understood by considering its three main features, viz.: the two moieties; the recognition of the four lines of descent listed above; and the extent to which lineal equations are made by the terminology, such that generally "the term applied to a man is also applied to his father, father's father, son and son's son, while one term is applied to the sisters of all these men."[37]

TABLE 1

Ungarinyin terms ordered by moieties*

A (m.) ⟵	b (f.)	a (f.) ⟶	B (m.)
nolingi (FF) wolmingi (WMF)	ngadji (MFZ) maringi (FM, WMM)	kaiingi (MM) amalngi (FFZ) wolmingi (WFM)	kandingi (MF) wuningi (FFZH) waiingi (WFF, FMB)
idje (F) wolmingi (WMB)	ngadji (M) maringi (WFZ) malengi (WMBW)	kaiingi (MBW) amalngi (FZ) wolmingi (WM)	kandingi (MB) wuningi (FZH) waiingi (WF)
nolingi (EB) [EGO]	ngadji (MBD) maringi (W) malengi (FZD)	lalingi (Z) wolmingi (WBW)	kandingi (MBS) wuningi (ZH) waiingi (WB) malengi (FZS)
idje (S) wolmingi (ZDH)	ngadji (SW) maringi (WBD) malengi (ZD)	amalngi (D) wolmingi (WBSW) mariengi (ZSW)	kandingi (MBSS) wuningi (DH) waiingi (WBS) malengi (ZS)
wolmingi (ZDS)	ngadji (MBSD) wuningi (ZSD) malengi (DD)	wolmingi (ZDD)	kandingi (MBSSS) wuningi (ZSS) malengi (DS)

*N.B.—The abbreviations in parentheses are not to be regarded as definitions of the categories or as exhaustive genealogical specifications. Not all positions denoted by the terms are shown. No inferences, however sure, are included.

A man's marriage is determined by the following factors (see Fig. 3). He cannot marry a woman from the line of his father's father, for this is his own line and of course is in his own moiety. He cannot marry a woman from the line of his mother's father, for the women of that line are all lineally equated under the term *ngadji*, i.e. with his mother, the woman through whom he is related to that line. Hence he cannot marry his mother's brother's daughter, for she is denoted by the same term as his mother; and conversely he cannot marry his father's sister's

37 Elkin, 1948, p. 67. Note that this single feature precludes any likelihood of the existence of a four- or eight-section system.

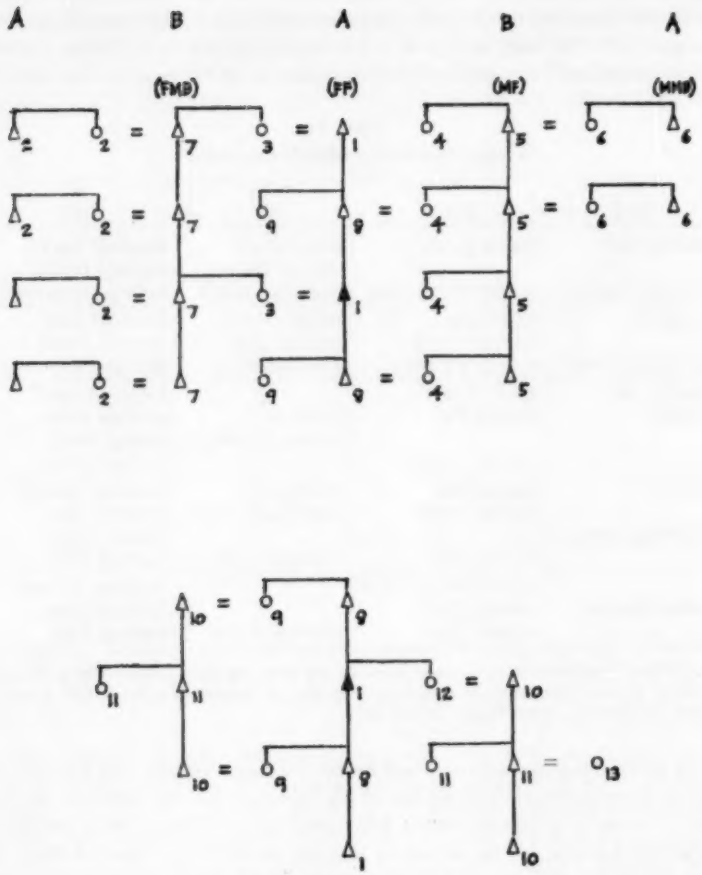


FIG. 3. The Ungarinyin system.

daughter either, and she is denoted by the term *(malengi)* which is also applied to his sister's daughter.[38] (The prohibition on the direct exchange of sisters is thus not an arbitrary elaboration, but is consistent with these usages.[39]) He cannot marry a woman from the line of his mother's mother's brother, for this line belongs to his own moiety. The only remaining line, then, is that of his father's mother's brother, which belongs to the opposite moiety and the women of which are all known as *maringi,* of which one of the specifications is "wife." One relative whom a man is allowed to marry, therefore, is his father's mother's brother's son's daughter.

But this genealogical specification is not the only denotation of *maringi:* the term also refers to father's mother, wife's father's sister, wife's brother's daughter, etc., and these are by category permitted spouses. A crucial refutation of Livingstone's suggestion is the clearly stated fact that a man may marry his wife's brother's daughter, "and this does happen."[40] This quite disposes of the possibility of prescribed alternation, for then a woman is taken from the same line in two successive generations. Furthermore, "in theory . . . a man may marry his father's mother": this does not happen, but Elkin did record a marriage with the widow of the father's father's brother, "which is sociologically the same thing."

The sole rule is that a man must marry "a woman of a horde which is *waiingi* to him,"[41] from which the "father's mother's brother" has to give "a woman of his local clan," who may be "sister, daughter, son's daughter, or son's son's daughter."[42] This leads us to yet another discrepancy between Livingstone's system and the ethnography, viz. that in his diagram FMBSD is equated with MMBDD, whereas in Ungarinyin society these relatives are on the contrary terminologically and structurally distinct: FMBSD is *maringi* and may be married, MMBDD is *ngadji* and certainly cannot be married.

38 That is, the "cousin terms" are of the type conventionally called "Omaha"; but I do not find this an exact or useful characterization, and I think it a mistake to say that it denotes a distinct type of social organization (Murdock, 1949, pp. 239-241). (This issue will be taken up again in another place.) On the other hand, I am indebted to an observation by Dr D. H. P. Maybury-Lewis for the realization that moiety systems with lineal equations, "Omaha" or "Crow," are not simply uncharacteristic but constitute a distinct sub-type. Ungarinyin society is one instance of this. (See Needham, 1960a, 1960c.)

39 Note also that the *wolmingi* (2) and the *kaiingi* (6) in Fig. 3 cannot be represented as unitary lines, by reason of these features; for otherwise the line of Ego's FMB, e.g., by taking wives from Ego's *wolmingi* line in succeeding generations would be marrying the mother's brother's daughter, which is impossible.

40 Radcliffe-Brown, 1931, p. 338; Elkin, 1932, p. 314; 1948, p. 68.

41 Elkin, 1932, p. 314.

42 Elkin, 1948, p. 68.

In sum, marriage is not prescribed with a woman who occupies one genealogical position. In fact, Elkin did not find one instance of marriage with "own" father's mother's brother's son's daughter, and he even reports an "objection to marriage with own second cousins."[43] Marriage is not even prescribed with a woman of a particular genealogical level, which means that there can be no alliance system based on alternating exchange. It should be noted, finally, that although the marriage regulations can be understood by reference to the two moieties and the four lines of descent, there are not, as Livingstone infers, only "four different kinds of local group" involved. Fig. 3 shows that Ego's line is related to five other types of line, i.e. of different term-composition, each of which may and almost certainly does represent at least one local group.

The examination of the Ungarinyin system could be carried further, but the exposition made to this point is enough for the present purpose. According to Livingstone, the data of Radcliffe-Brown and Elkin on the Ungarinyin "seem to suggest" that this tribe may have such a system as he proposes: however, he adds, "their statements do not entirely support the existence of such a system among the Ungarinyin. . . ." It is perplexing that it was ever thought that they did so at all.

Bibliography

Elkin, A. P.
1932 *Social Organization in the Kimberley Division, North-western Australia* (Oceania, vol. 2 [1931-32], pp. 296-333).
1938 *Kinship in South Australia* (Oceania, vol. 8 [1937-38], pp. 419-452).
1948 *The Australian Aborigines and How to Understand Them* (Sydney).

Leach, E. R.
1951 *The Structural Implications of Matrilateral Cross-cousin Marriage* (Journal, Royal Anthropological Institute, vol. 81, pp. 23-55).
1954 *Political Systems of Highland Burma: a Study of Kachin Social Structure* (London).

Lévi-Strauss, Claude
1949 *Les Structures Élémentaires de la Parenté* (Paris).

Livingstone, Frank B.
1959 *A Formal Analysis of Prescriptive Marriage Systems among the Australian Aborigines* (Southwestern Journal of Anthropology, vol. 15, pp. 361-372).

Murdock, George P.
1949 *Social Structure* (New York).

Needham, Rodney
1958a *A Structural Analysis of Purum Society* (American Anthropologist, vol. 60, pp. 75-101).

43 Elkin, 1938, p. 443.

1958b *The Formal Analysis of Prescriptive Patrilateral Cross-cousin Marriage* (Southwestern Journal of Anthropology, vol. 14, pp. 199-219).
1959 *Vaiphei Social Structure* (Southwestern Journal of Anthropology, vol. 15, pp. 396-406).
1960a *A Structural Analysis of Aimol Society* (Bijdragen tot de Taal-, Land- en Volkenkunde, vol. 116, pp. 81-108).
1960b *Alliance and Classification among the Lamet* (Sociologus, vol. 10, in press).
1960c *Lineal Equations in a Two-section System: a Problem in the Social Structure of Mota (Banks Islands)* (Journal of the Polynesian Society, in press).

RADCLIFFE-BROWN, A. R.
1931 *The Social Organization of Australian Tribes* (Oceania, vol. 1 [1930-31], pp. 34-63, 206-246, 322-341, 426-456).

UNIVERSITY OF OXFORD
OXFORD, ENGLAND

A FRESH APPROACH TO THE PROBLEM OF MAGIC AND RELIGION[1]

MISCHA TITIEV

ABOUT SEVENTY YEARS AGO the great scholar of primitive religion, Sir James G. Frazer, found it advisable to divide all phenomena involving the supernatural into the two categories of magic and religion. Almost at once large numbers of social scientists found Frazer's dichotomy useful and began to emphasize the criteria which, in their opinion, separated the one category from the other. In the course of time it became customary to stress four factors, although others were sometimes invoked. The four attributes that came to be most often cited run somewhat as follows.

1. Magic *compels* the world of the supernatural to do its bidding. It fails to get results only if errors of procedure or text have been made, or if stronger counter-magic has been brought to bear. Religion, on the other hand, say the supporters of Frazer's dichotomy, never guarantees results. Its use is limited to *supplication,* and its practitioners never resort to manipulation or coercion.

2. Magic, according to Durkheim and his followers, has no "church." That is to say, magical rites may be public or private but, unlike those that are religious, they do not have to have a large body of celebrants; they do not need to be held in public before a congregation of worshippers; and they may have no social or communal aspects whatsoever.

3. Magical utterances have a tendency to degenerate into spells or formulas, some of which have little or no meaning even to those who say them. It is implied that religious pronouncements are usually meaningful in terms of a society's customary language.

4. Practitioners of magic, even in primitive societies, are often set apart in one fashion or another from socially recognized priests. With occasional exceptions it is only acknowledged priests who go through a period of formal training and who then qualify to perform communal or publicly sanctioned religious exercises, leaving shamans and others to deal in magic.

Although most writers on the subject have continued to accept Frazer's distinction, somewhat apathetically, it must be confessed, others have held the criteria to be unsatisfactory because they cannot be precisely determined and because they so frequently overlap. Indeed, some contemporary anthropologists have found the

1 This article is based on a paper that was read in Mexico City on December 29, 1959, during the annual meeting of the American Anthropological Association.

I am greatly indebted to my wife, Estelle, whose penetrating comments did much to improve this essay.

customary divisions between magic and religion to be so vague and indeterminate that they have refused to recognize the traditional dichotomy and now prefer to treat both sets of practices as one. Indicative of this attitude is Dr Hsu's statement, written only a few years ago, that "whichever criterion we employ, we are led to the conclusion that magic and religion, instead of being treated as mutually exclusive entities, must be grouped together as magico-religion or magico-religious phenomena. This is a position increasingly endorsed by anthropologists."[2] Nevertheless, even if we grant that modern critics have many points in their favor, there are a number of anthropologists who still believe that a distinction needs to be made between what they feel are two essentially different kinds of human behavior, each of which makes an appeal to the supernatural world for help, guidance, or comfort.

As a fresh start toward a workable dichotomy, it may be well to distinguish two kinds of activities on a new basis, one that rests on a criterion that is precise, but has not been traditionally utilized by former analysts. In all primitive societies one set of practices involving the supernatural always takes place recurrently, and may, accordingly, be termed CALENDRICAL; while the other set, which is celebrated only intermittently, and then only when an emergency or crisis seems to have arisen, may be called CRITICAL.

Because of their very nature calendrical rituals can always be scheduled and announced long in advance of their occurrence. This gives the people of a community ample time to develop a shared sense of anticipation, and an opportunity to get ready for a big event. On the other hand, it must be realized that if a celebration is to be performed at a definite time or season in the future, it cannot possibly take into account the immediate desires for supernatural assistance or comfort of the whole society or of any of its parts. To cite one instance, the gigantic figure of Shalako appears in Zuni each December, regardless of the frame of mind of any particular inhabitants of the village.

One can find calendrical rites even in Christianity.[3] Christmas is an excellent example. Throughout the Western world it is celebrated annually on the twenty-fifth day of December, regardless of the wants or needs, on that particular day, of individual Christians or of any congregation of Christians.

As a rule, calendrical performances are entrusted to officially-sanctioned priests, rather than to other persons who may deal with the supernatural; and since ceremonies based on a calendar cannot possibly be geared to anyone's immediate de-

2 Francis L. K. Hsu, *Religion, Science and Human Crises* (London, 1952), p. 4.

3 Although Christianity is anything but a primitive faith, it is here used for illustration because of its world-wide distribution and its great familiarity.

sires, they can be interpreted only as having value for an entire society. In this sense, especially, calendrical observances may be said always to have a "church," and to correspond, on the whole, more nearly to established concepts of religion than to those of magic.

Moreover, since they are always social or communal in character, calendrical rites invariably tend to disappear when a society loses its distinctiveness or radically alters its old ways of life. Thus, when the Hopi Indians of Oraibi began to show greater interest in White than in native culture, the pueblo's calendrical observances were among the first cultural items to suffer disintegration.

In a similar vein, long before the establishment of Israel, the Jews were of particular interest to social scientists partly because they managed to give the impression of being a single society, even though it was patently obvious that they were not, inasmuch as they were scattered among many, many nations. What, then, gave observers the impression that the Jews constituted *a society?* Above all else, it was the fact that regardless of their places of residence the Jewish people steadfastly continued to observe such traditional calendrical (social) ceremonies as Passover and Yom Kippur.[4] It is noteworthy in this context that whenever Jews become assimilated into any originally alien society, they stop observing their ancient calendrical rituals.

Quite different in nearly every respect are those practices, also based on a belief in the supernatural, that we have termed critical. They are, let us recall, customarily designed to meet the pressing needs of a given moment. For this reason they can never be held only because a particular time has arrived, nor can they be announced, scheduled, or prepared for far in advance. In some cases critical ceremonies may be performed by priests, but in a large number of instances they are conducted by other personages.

Unlike calendrical observances which are *invariably* communal or broadly social, critical rituals may be designed to benefit either a whole society, a relatively small group, or even a single individual. It should be obvious that every now and then a critical rite may be held to counteract a public emergency, as when a prolonged drought affects all the farmers in a given community, or when an entire nation prays for peace. However, crises on this scale are comparatively rare. For the most part critical ceremonies are staged only when a private or personal emergency has arisen, as might be the case if something important has been stolen or mislaid, or if a child has fallen gravely ill, or in the event that an individual has entered on a new social position that disturbs his former dealings with the members

4 Judaism cannot be regarded as a primitive religion, but it is used to illustrate a point for much the same reasons as was Christianity; see the preceding footnote.

of his society. In such cases critical rituals are designed to benefit only those who have asked, and sometimes paid, for them. A reëxamination of the rich material from Africa, as well as from other regions, pertaining to the services rendered by seers, diviners, fortune-tellers, medicine-men, and so forth, shows that their approach to the supernatural is far more often on behalf of persons who have a problem than it is for the sake of whole societies or communities. These instances show that critical observances do not inevitably need to have a "church." Since, at the same time, they do not necessarily have to be performed by socially sanctioned priests, they tend in a number of ways to correspond quite closely to traditional concepts of magic.

It should be noted further that whereas calendrical rites ordinarily disappear when a society diminishes in power or loses its identity, critical rites may persist long after an entire society has collapsed, and in a new social setting may form the basis for a large number of the carry-overs that students of religion generally call superstitions.

Since the distinction here made cannot be maintained without the existence of some form of a calendar, it is essential to show that even the most primitive and non-literate of people may have a simple way of keeping track of the year's progress. In the northern hemisphere, whose varied religions are far better known to anthropologists than are those of the people who live south of the equator, the easiest method involves no more than noting, from exactly the same spot each day, where the sun seems to rise. When this is done regularly the sun apparently travels from north to south between June 21 and December 21, and from south to north during the remaining six months. Whenever the eastern horizon happens to be irregular it appears as if the sun comes up now from a mountain peak, now from a bit of forest, now from an open stretch, and so on. In this way the coincidence of a sunrise with a particular landmark may serve as a seasonal checkpoint (see Fig. 1), and as an indication of the time when a given calendrical rite ought to be announced or performed.[5] The terminal or turning points in the sun's annual course mark the solstices.[6] In many communities of the northern hemisphere, even

5 In Cochiti, for instance, "For the winter solstice ceremonial, observations of the sun in relation to Nipple Mountain are taken by the town chief" (E. C. Parsons, *Pueblo Indian Religion*, Chicago, 1939, vol. 1, p. 533).

6 Religious calendars need not be based only on recognition of the solstice points. Other regularly recurrent events, such as the equinoxes, the onset of dry or rainy seasons, or the annual flooding of particular streams, may also signal the time for fixed supernaturalistic celebrations. Concerning this matter in general, Alfred Métraux points out that the Chiriguano of South America used the yearly course of the Pleiades "to reckon time" (*Handbook of South American Indians*, J. H. Steward, ed., Bulletin 143, Bureau of American Ethnology, Washington, 1948, vol. 3, p. 483).

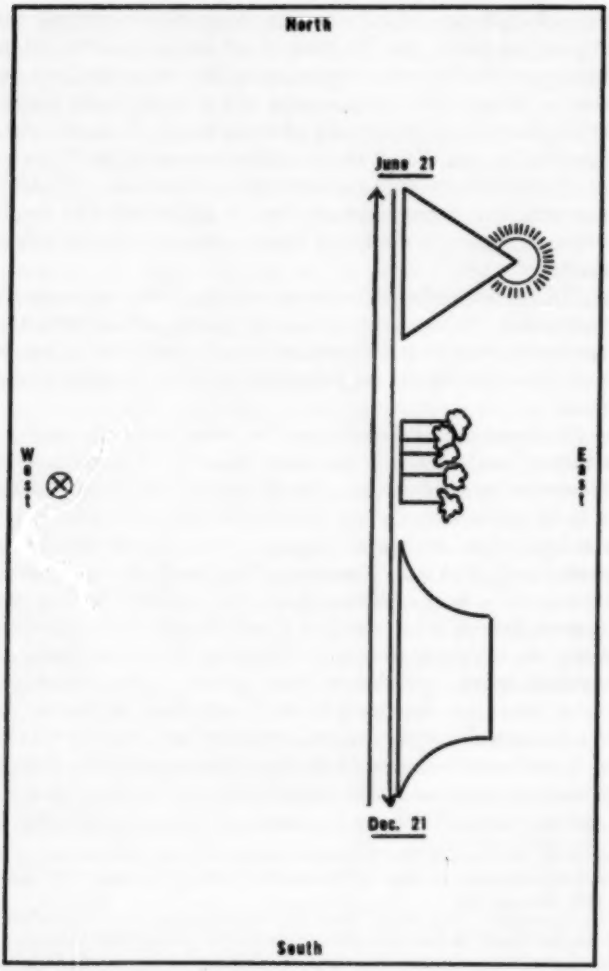


FIG. 1. A natural calendar. An observer standing daily at × would see the sun rise from various features of the eastern horizon. Thus, the coincidence of a sunrise with a natural landmark would serve as a calendrical check point.

if the June solstice is unnoticed, it is customary to hold important calendrical rituals on or about December 21.

The main reason for this difference of attitude and behavior seems to stem from the fact that whenever it reaches either of its solstice points the sun at first makes so little daily progress in the opposite direction that it appears to rise in the same spot or, in a manner of speaking, to hesitate or to stand still for three or four days. When this "hesitation" takes place on June 21, there is little to fear, for vegetation is usually plentiful, crops are growing, and the weather is balmy. But it is quite another matter when the sun pauses at its southern terminal and appears reluctant to move northward,[7] in the direction of spring and summer. Such a threatened stoppage would, indeed, be a calamity. It might result in perpetual winter, no fodder for animals, and no crops for man. That is why strenuous efforts are sometimes made to get the sun to turn from its southern to its northern path; and that is also why winter solstice observances so commonly take the form of new-fire rites, or else include a number of symbols expressive of man's desire for increased light and heat.[8]

Never should it be thought that calendrical ceremonies, because they may disregard the needs of the moment, are only of secondary importance. Far from it! Analysis of their intent reveals that they are designed primarily to strength the bonds of cohesion that hold together all of a society's members or else to aid the individuals who form a social unit to adjust to one another and to their external environment.

Our dichotomy should not be interpreted as a device for classifying every conceivable aspect of primitive religion. For instance, it does not apply smoothly to all the manifestations of the famed rites of passage. It is true that three of Van Gennep's stages—birth, marriage, and death—are critical, because they are concerned primarily with individuals and cannot be precisely determined in advance; whereas the fourth—puberty or tribal initiation—is often calendrically observed. Yet, all of the rites of passage drastically change a person's social relationships, and, therefore, all of them may be classed, as they usually are, as critical.

For many anthropologists in the United States, especially, the old distinction between magic and religion has lost much of its pristine vitality and freshness. Unless we are prepared to lump all supernatural phenomena into a single category,

7 According to Parsons, *op. cit.*, p. 544, the winter solstice is referred to at Isleta as " 'North our Father [the Sun] goes.' "

8 It is interesting to note that similar symbols are very prominent at Christmas or Channukah observances which Christians or Jews, respectively, hold late in December. During Channukah an additional candle is lighted each day for a week in a seven-branched candelabrum, thus clearly indicating a plea for a daily increase of light and heat.

we need a fresh basis for classification and analysis. That is what the proposed difference between calendrical and critical rites is meant to provide. The likelihood is strong that every social unit's system of supernatural practices contains both calendrical and critical elements. In partnership, these may be seen to function as vital parts of every primitive society's non-empirical method for trying to gain desired ends.

THE UNIVERSITY OF MICHIGAN
ANN ARBOR, MICHIGAN

THE MARRIAGE NETWORK AND STRUCTURAL CHANGE IN A NORTH INDIAN COMMUNITY[1]

WILLIAM L. ROWE

RECENT STUDIES of the Indian village have reflected a growing interest in the total ramifications of the life of a village or a segment of a village population. Lewis has written of "rural cosmopolitanism" showing that Rani Khera, a small north Indian village of 150 households, has affinal kinship ties with over 400 other villages.[2] Marriott writes of Kishan Garhi, a village in western Uttar Pradesh, that it is connected by marriage with over 300 other villages.[3] Opler has commented on the "extensions" of the village of Senapur in north central India, marking the kinship, religious, political, and economic interactions of the village with the outside world.[4] Each of these studies has also emphasized the complex impact of dynamic social change now confronting the tradition-oriented village, and each has in some measure been concerned with the validity of the choice of the village as a unit of analysis. Singh has emphasized the aspects of caste and the landlord-tenant system which heighten the unity of the village.[5]

This paper will examine the extra-village extensions of a low-caste community through consideration of one aspect of its social structure which I shall call the *marriage network*, that is the network of caste communities related to one of the Senapur village caste communities by marriage. I shall also indicate how recent political and social forces in Indian society are altering the traditional social structure, which heretofore emphasized the ties of the various caste communities of a village to the dominant-caste-controlled village. In lieu of this emphasis on village ties, we find a shift to a greater interaction with the other villages of the marriage network. The network increases its structural importance in the total social organization and raises the question of its possible function as a channel of further change. Contrary to the expectations that traditional aspects of Indian rural society would crumble or disappear under the impact of significant economic and political change, this paper illustrates how the society is utilizing a traditional institution to fulfill new functions and to meet new needs.

1 This article is a revised version of a paper read at the 58th Annual meeting of the American Anthropological Association in Mexico City, December, 1959. Fieldwork was done in north India between August, 1955, and July, 1957, under a fellowship from the Cornell University India Research Project. I am indebted to Morris E. Opler for his direction and for many suggestions both in the field and in the analysis of these data. I would also like to thank James M. Mahar, McKim Marriott, Edward B. Harper, Bernard Cohn, and John Gumperz for their helpful suggestions and criticisms.

2 Lewis, 1955, p. 163.

3 Marriott, 1955a; 1955b, pp. 100-102.

4 Opler, 1956.

5 Singh, 1956.

MARRIAGE AND THE MARRIAGE NETWORK

The following account refers to the marriage practices of the low-caste *Noniya*, one of twenty-three caste communities in Senapur village. The *Noniya* community consists of 303 individuals living in forty-four households, representing about 14 percent of the Senapur village population. As is typical of north Indian Hindu castes, the *Noniya* are patrilineal, patrilocal, and practice caste endogamy and village exogamy. Unlike some high-caste groups, there are no subdivisions *(gotra)* of the caste, although in recent decades there has been an unsuccessful move to adopt *gotras* after high-caste models. A tendency toward hypergamy is noticeable but is limited to a consideration of economic and social factors. In contracting a marriage, the girl's family takes the initiative in seeking a bridegroom, negotiating the dowry which must be paid, and in providing the locale for the wedding. Informants claim that the individual should not contract a marriage with a person who is related as close as seven degrees from the father and five degrees from the mother. Marriage takes place through a series of ceremonies which should commence—for the woman—sometime before puberty and culminate shortly after puberty. Males are slightly older, and, in the case of high school or college boys, the ceremonies allowing consummation of the marriage may be delayed until completion of education. A formal acceptance of the marriage contract *(tilak)* by both families occurs, usually several months before the marriage ceremony proper *(biyah)*. Dependent upon such factors as the physical and emotional maturity of the bride and bridegroom, the economic position of the families, and upon astrologically auspicious signs, the third step *(gauna)*, permitting consummation of the marriage and permanent removal of the bride to her husband's home, takes place. However, it must occur in either the first, third, or fifth year following the marriage ceremony proper *(biyah)*. Relationships between the affinally related families commence after the initial marriage contract *(tilak)* ceremony and are maintained through the years before the ceremony of consummation *(gauna)*. These relationships persist until the death of the bride, and in some cases several generations beyond. Every woman is married in *Noniya* society, as in all of Hindu society, for arrangement of a daughter's marriage is among the strongest of social and religious imperatives which a parent must observe. In addition, among this caste, young widows are almost immediately remarried.[6] The junior levirate is permitted but is interpreted as a sign of expediency and is an unprestigeful form of marriage.

We find that, by locating on District maps the actual villages of origin of

6 Despite the strong upwardly mobile drive of the caste—which would suggest abandonment of widow remarriage in emulation of high-caste practices—*Noniya* continue widow remarriage. This is most probably due to economic necessity on the part of the families concerned.

women who have married into the Senapur *Noniya* community and then by marking the villages to which girls from Senapur have been given in marriage, a spatial representation of the marriage network can be seen. The average distance from Senapur of these villages is twelve miles, the nearest being only three miles and the farthest fifty-five miles.

The eighty "daughters of the village" have been given in marriage in forty-four different villages while the ninety-one living "brides" have come from fifty-two villages. The term "daughter of the village" refers to any woman born in the village regardless of age or current residence. "Bride" is used in this setting to refer to any woman who has married into the village, and does not refer to recency of marriage.[7] Contrary to the ideal pattern, there are ten villages in the network where women have been both given and taken. Of these ten exceptions, eight are villages which seem "popular" for marriage relations, having over five and as many as ten affinal contacts in a village. The data indicate that a village may be popular in one generation, but then fashion changes and in succeeding generations we find new popular clusters. It is perhaps easier to arrange a marriage in a village already known to one's immediate caste neighbors. There is perhaps less unwillingness to give a daughter in such a community, since she will at least have the company of girls she has known in childhood. The painfulness of separation from the natal home, so marked in the folk stories and songs of North India, can in this way be partially alleviated.

By virtue of village exogamy and patrilocal residence, the Senapur *Noniya* community is involved through marriage in a network of eighty-six different villages. Although affinal relationships are sometimes kept up long after the death of a woman who was responsible for the nexus, there is inevitably a movement of villages out of the network and of new villages into the marriage network. Clusters of women placed in "popular" villages of marriage limit the potential size of the network, but a concentration of ties in one village allows for a very strong inter-village relationship in a way that is not possible for the non-popular villages. At present there are twelve villages which are popular in that they each have five or more marital ties with the Senapur *Noniyas*.

Analysis of the physical movements to and from Senapur shows that in most cases travel is within this network, emphasizing the social, religious, economic, and political importance of the marriage network in the life of the *Noniya*. Each of the forty-four *Noniya* households of Senapur was interviewed for three separate seven-day periods regarding visits to its home by persons outside the village

7 Mrs Irawati Karve (1953, p. 129) states that this use of terms is characteristic of north Indian kinship.

and regarding visits to other villages by household members. A "visit" in this context refers to *each* person who called at a household. It was usually found that even when several persons came in a group, each visitor had his own reason for the trip.

The households were first interviewed at the end of August, 1956, for a seven-day period of rather typical agricultural intensity which was marked, however, by the death feast of an important member of the community. This religious and social rite had brought a large number of people to the village. Again they were interviewed at the end of December, 1956, covering a week which had been characterized by heavy agricultural work and at a time when large numbers of young men are temporarily out of the area for wage work in Assam and Bengal. During this week chickenpox was present in the village, which entails a strong prohibition against travel or visiting. In March, 1957, all the households were again interviewed. During this period the important Hindu calendrical rite, *Holi,* occurred. It was a time of agricultural inactivity and fell in the season when parties of men visit villages seeking out bridegrooms for the marriage season in the following summer months.

Of a total of 123 inter-village visits either made or received during the three periods, 86 percent were to or from households of marital relationships.[8] In the third period a group of five visits is included in the non-kin category. These men were members of a party searching for a bridegroom, and they visited the Senapur *Noniyas* to negotiate for a particularly eligible bachelor. Information regarding him had been gained through *Noniyas* related to Senapur by marriage. The visitors were related by marriage to members of this group. In this way a second or extended marriage network can be seen to exist. This extended network operates, for example, in Bombay when two *Noniyas,* initially strangers, manage to relate each other to some third marital connection. This need not be to a specific household, since the system of fictitious kinship labels all members of a village in terms of its marital relationship to male ego's village. A village either gives its daughters to ego's village as brides or receives brides from ego's village. Ego is either in a superior power position (that is, his village receives the other village's women) or in the inferior position of giving its daughters there. The roles are uniform for all the members of the same caste in a village and are not limited to members of the two maritally connected families.

8 In an intensive 14-month study of all the inter-village visits of a community of *Chamars* in a village of northwestern India 500 miles west of Senapur, it was found by Mahar (1959) that 87 per cent of all visits were of a kinship nature.

En route to the bazaar town or to the District court, *Noniyas* will prefer to stop for rest and refreshment at the household of an affine in one of these villages. They will exchange news about events in the two villages and about political and caste matters. When a Senapur man visits an affinal village he should ideally call at all the households related to Senapur by marriage. Oftentimes he will have been charged with various errands and tasks by people in Senapur. In turn he will bring back news, gifts, and various commissions from the affinal village. One of the reinforcing mechanisms to the network is that families searching for bridegrooms will utilize such contacts to inquire about suitable marriage partners.

Senapur *Noniyas* do not have any appreciable contact with *Noniya* communities which are not in the marriage network. This is most dramatically shown in the almost complete ignorance about the *Noniya* communities nearest to themselves. The first *Nonyia* settlements in each direction of the compass are almost entirely unknown, since the *Noniya* of Senapur are prohibited from having marriage connections with these adjoining villages. The *Noniya* of Senapur explain their lack of contact with and knowledge of these communities nearest them by saying that they are *bhai* (brothers).[9] When I wanted to be introduced to the *Noniya* leader of one of these settlements, it was only possible through the fact that a woman married into Senapur had a sister who had married into this nearby settlement. This example is an instance of the ascendance of the marriage network over the *biradari* (caste brotherhood).

Although this paper stresses the importance of the affinal relationship, it should, of course, be noted that there are blood kin in the villages of the network, making possible the affinal tie. In a male-centered society it is perhaps not unusual that it is the men who mostly make visits, that they interact with men in the villages they visit, and therefore tend to stress the affinal aspect. The marriage network overlaps with the blood kin on one side and with the caste brotherhood *(biradari)* on the other.

The death feast mentioned previously is only one of the life-cycle rites which entails close contact with the network. Perhaps the most important is that of marriage *(biyah)*, where affinal relatives share the responsibility for the expense and work in the elaborate rites, entertainment, and feasting during the several days of a wedding. In the case of the death feast, too, material contributions and help are received. At the time of the annual *Ram Lila*, a religious pageant depicting in

9 Mrs Irawati Karve (1953, p. 119) has reported this custom as she found it in northwestern India where it is called Brotherhood of Boundaries (sim sim no Bhaiyāchar). *Noniyas* of Senapur did not use this term.

ten days the exploits of *Rama* and *Sita,* many affinal relatives come to Senapur where they combine visiting with attendance at the festival.

Any of the calendrical rites may be an occasion for a villager to visit kin in another village. Often this visit will combine several functions. However, there are certain calendrical rites which, by their nature, entail contact between kin in the network. On the occasion of *Raksha Bandhan* in August, a sister traditionally ties a colored charm on her brother's wrist. This is a symbol of her claim on him as protector. After her marriage she continues to honor this day by sending him the *raksha.* In turn he is expected to send her gifts including clothing and food. This rite emphasizes the brother's role as intermediary between the parental and marital homes. It is the brother who takes the bride to and from her marital home, being the one person who is sanctioned to visit her freely in her husband's home. It is significant that a high-caste informant voiced his disapproval of the recent changes in Indian law allowing inheritance by daughters, arguing that close relationships existing between brother and sister and between brother and sister's husband would be altered. The sister traditionally is understood to have left her natal lineage at marriage. Her line has fulfilled its major material responsibilities to her through payment of a large dowry to her husband's lineage. Brothers inherit at the death of the father. If the sister were to inherit land from her father this would in effect bring her husband—a man of another lineage and village—into her brother's lineage, and would disrupt an important pattern of traditional stylized kin roles. The informant quoted a proverb illustrating the brother's importance: *Jis ki bahin andar us ka bhai sikander* which freely translates "A girl's brother is as powerful as Alexander the Great when he visits his sister at her husband's home."

In early November a rite is performed permitting the first consumption of sugar cane by adult villagers. Stalks of cane are distributed to friends and servants and are sent to relatives in the villages of the network.

A most important rite which has considerable meaning in strengthening ties with married daughters and which often involves considerable exchange of wealth is *Khichari* (literally, a type of food consisting of pulses and rice, which is served on this day). On this day in January, gifts are sent to married daughters by parents. These typically include a complete set of clothing and specified foodstuffs.

A rite with similar implications is *Tij* in early September. On the occasion of *Tij* in 1956, gifts in the approximate value of 340 rupees were exchanged, two-thirds of the gifts on this occasion having been sent out of the village to married daughters or to young brides who had not yet moved to their village of

marriage. Three hundred and forty rupees is a significant sum in a group whose per capita income is estimated at 131 rupees per year.

There are also other instances in which villages within the network interact on economic matters. An informal system of exchange of labor between families in the network may take place. It may be for the purpose of helping out an understaffed farmer or in temporarily ridding a family of an inessential member for whom there may not be sufficient food. These exchanges are not always between related families, but they are always between villages in the network and never across caste lines. For prestige reasons alone, they do not occur within the village. Some of these labor shortages result from the prevalent custom of outside employment, temporarily in the winter or permanently in Bombay. In this connection, data collected in Bombay highlighted the effectiveness of the network as a labor pool for recruitment to Bombay. In a brief study there it was learned that in no cases did individual laborers from Senapur come anonymously to the city, but always with kin. Frequently they came with the assistance of, or had been recruited by, either affinal relatives or caste members in affinally connected villages. The marriage network provides a large labor pool which serves to equalize labor needs and surpluses.

Equipment is also frequently lent between villages, as are draft animals which are sometimes obtained from relatives. Although cash is occasionally borrowed on interest from landlords or money lenders in the natal village, it is considered preferable to borrow from one's relatives; and this serves as a further tie within the network.

Though we have emphasized the economic and social aspects of calendrical and life-cycle rites we must not lose sight of their essentially religious nature. Religious rites in connection with the building of a new house, particularly the foundation and house-entering ceremonies, are nearly always occasions when relatives in the network are called to Senapur. Other religious rites are performed in fulfillment of vows made to deities, or as ceremonies of thanksgiving to one or another of the gods of the Hindu pantheon who has aided the sponsor of the ceremony. The scale of the ceremony, the costliness of the religious accouterments, and especially the lavishness of the feast which follows it are events of social as well as religious significance in that they serve to validate social status. At such an event it is important to have invited distant relatives and friends from the villages of the network.

The realm of the supernatural is not limited to the specifically Hindu rites or deities, and it is in regard to a different set of regional and local spirits, the *bhuts,* that much activity takes place. Whereas openness and pride surround the religious

rites of the Great or orthodox Hindu tradition, secrecy and reticence are associated with the various shamanistic activities to control *bhuts,* the evil, malignant spirits which bother *Noniya* men and women. In many of the cases, it is significant that often the victim consults a *Noniya* shaman of another village, usually a village of some affinal kin. In another village—ostensibly visited for social reasons—diagnosis and treatment can more easily proceed in secrecy. There are two particularly auspicious periods in the year, each called *Nauratra* (or the Nine Nights), during which these visits often take place. Senapur *Noniya* shamans have many of their clientele in the villages of the marriage network.

Formerly in *Noniya* communities *Bachila Devi,* a goddess believed to be protectress of the *Noniya,* was worshipped by the blood sacrifice of a piglet. Worship of *Bachila Devi* was mandatory at the wedding of a male *Noniya* and at the commencement of any dangerous or important enterprise such as the firing of a brick kiln or the digging of a well. These events are said to have been large and were well attended by villagers of the network. Since blood sacrifice is now generally associated with non-Hindu elements of the religious life, it has been progressively abandoned during the past thirty years as a result of the *Noniya* sociopolitical movement claiming the status of high-caste *Chauhan Rajputs.*

In following the course of the *Chauhan* movement as it was introduced and as it eventually changed the lives of Senapur *Noniyas,* I found that the transmission of the creed declaring their exalted high-caste status, and with it their right to wear the sacred thread of the twice-born castes, proceeded through the marriage network. Leaders in other villages of the network brought about the involvement of Senapur *Noniyas,* specifically through the personality of Ram Nath, a forceful young *Noniya* leader of Senapur. It was through his affinal connection with an advanced *Noniya* village near District headquarters that he became suffused with the ideals of the new movement. Several years later it was again through the help and guidance of educated *Noniyas* of this affinal village that Ram Nath was able to guide his Senapur brethren through political and legal difficulties brought about by the insistent *Noniya* drive towards economic and social mobility. There are other villages, nearer and perhaps even more "progressive," but it seems quite clear that this particular relationship grew because of the mutual involvement in the marriage network.

Nine villages in the Senapur *Noniya* network, all within a twenty-five mile radius, were visited and briefly studied. There appeared to be considerable variation in the economic and educational status of the caste. This caste has been involved in a conscious social movement during the past two generations; yet despite continuous interaction there are such glaring contrasts that even a cursory

glance shows the existence of considerable diversity. At the upper end of the continuum we found a *zamindari* (estate) of fifteen villages under a *Noniya* lineage. In terms of land holdings, extent of education, number and size of *pakka* or brick dwellings, the families in this lineage favorably compared with the wealthier of Senapur high-caste *Thakur* families.[10] Not far from Senapur, however, is a *Noniya* settlement where most of the men are forced to hire themselves out as day laborers in the fields of others, for they are for all practical agricultural purposes landless and live in small mud huts roofed only with thatch. The Senapur *Noniya* community is somewhere near the midpoint on this continuum.

In time of difficulty member villages of this network can assist the home community in several ways. Although conflict among the castes within a village has perhaps been overstressed in the past, it did seem to me that, once overt trouble occurred, *Noniyas* fell behind some semblance of a caste barricade. Their inferior power position often makes this barrier rather weak. At such times the network can be of assistance. Affinal relatives can provide refuge for the man who finds himself in trouble in his home village. This help may be offered in the affinal village or in a settlement of affines in Bombay or some other urban center. The man may well call upon his mother's brother or his wife's brother for aid in such cases. Leaders of low-caste political movements in the Senapur area have had to flee the village in times of turmoil and have then used these affinal connections. Not every case of political dispute can be solved by the temporary absence of a single person. On occasion of actual threatened physical violence it may be necessary to assemble groups of men from the villages of the network. Such a showing of men graphically illustrates to the opposition the necessity to arbitrate a dispute.

Although the *Noniya* have no organization of permanent caste *panchayats* (courts) on an area basis, *panchayats* are called to settle caste matters on an *ad hoc* basis. It is important in these courts to invite *panches* (judges) who are known and respected by both sides of the dispute, but not directly involved in the issue. These judges will often be respected caste elders from villages of the network.

In one celebrated case, that of a long, drawn-out law suit against an impoverished *Noniya* by a local landlord, the tenant had printed a statement of his case and circulated this among *Noniya* communities of the network. He was able to solicit enough financial help in this matter both to fight the case in court and

10 *Noniya* males sufficiently advanced economically and educationally to validate their *Chauhan* status may be found as lawyers, school teachers, and petty government officials at District headquarters or in larger cities. Inquiry revealed that a very different marriage network exists among this small elite, the wives for such men being drawn from wealthy contracting or landed families. The geographical limits of this elite network runs to 300 miles or more in the few cases which we investigated.

partially to support his family during that time. Investigation showed that most of the people who gave money or aid in kind were not related to the man but were members of caste communities in the marriage network.

One would like to know how typical the existence of such a network is. The conditions of its existence seem to be met particularly by low-caste groups throughout northern and western Indian where village exogamy and patrilocal residence are the rule. In higher caste groups, where a clan system is operative as among the *Thakurs* and *Brahmans* of the Senapur area, complications arise in that the marriage network does not necessarily coincide with the totality of a caste community in a specific village, for several clans may be represented in one caste settlement. Another necessary condition is that of fictive kinship, for otherwise we would not find the strength of acceptance towards an entire village. This warmth is made possible by fictitious relationship. The above conditions probably do exist for a large number of caste communities throughout northern India.

DISCUSSION

Having described the marriage network as an analytic unit in the social structure of the *Noniya*, we now wish to relate this unit to the more general historical context in which Hindu caste communities have operated during the past sixty years, and particularly to the very great social and political changes which have occurred since the independence of India in 1947. Movements comparable to that of the *Chauhan-Noniyas* have occurred throughout Indian history.[11] However, the impact of such nineteenth century Western economic developments as the construction of railways by the British colonial government and of the industrial development of such cities as Kanpur, Calcutta, and Bombay, combined with the Indian ideological response to Western thought, produced Hindu reform movements such as the *Brahmo Samaj* and the *Arya Samaj*.[12] Both the tempo and the nature of low-caste demands changed. In north central India, where the *Noniya* are numerically strong, the *Arya Samaj* was a powerful supportive influence to the growth of organizations like the *Chauhan Rajput Pacharni Sabha* (Chauhan

11 Bailey, 1957, pp. 181-191, 270-271; Blunt, 1931, pp. 227, 265; Ghurye, 1957, pp. 192-193; Hutton, 1951, pp. 50-51; O'Malley, 1932, pp. 161-182; Srinivas, 1956, pp. 481, 491-492; 1957, 530-531.

12 The *Brahmo Samaj* was founded in 1828 by Ram Mohan Roy (1772-1833), a Calcutta Brahmin intellectual. The organization preached ideals of social reform, monotheism, and anti-idolatry, and was immensely influential among the intellectual elite of Bengal and north India. The *Arya Samaj*, founded by Dayananda Saraswati (1824-1883) in 1875 at Bombay, stressed a return to the principles of the Vedic age, rejected all Western ideas, and had its greatest influence in the Punjab and Uttar Pradesh among the middle classes.

Rajput Advancement Society) which was founded in 1898 by *Noniyas,* newly rich through contracting in the construction of the railways.[18]

In 1936 in the Senapur area *Chauhan-Noniyas* resolved that all adult *Noniya* males would wear the sacred thread *(janeo),* symbol of the twice-born status of the highest Hindu castes. In Senapur in response to this movement, *Noniyas* were beaten and the caste was collectively fined by the *Thakurs,* the then dominant landlord caste.

Thakur control of the land, combined with the fact that a tenant caste, such as the *Noniyas,* had no effective political power or representation, provided the landlords with effective mechanisms to check the *Chauhan* pretensions of the *Noniya.* In addition to the formally set payments of rent, tenants were required to render homage and specified amounts of forced labor *(begar)* on an annual basis. Some years later the *Noniyas* resumed the wearing of the sacred thread unopposed by the high castes.

Through the *Uttar Pradesh Panchayat Raj Act of 1947,* which provided for the establishment of representative local village government, low-caste men were elected and came to control the Senapur village government. The traditional leaders, landed *Thakur* elders, ignored the new governing body and continued to make the significant village decisions. With the implementation of the *Zamindari Abolition Act of 1950* (providing for at least partial abolition of landlordism), vast changes in village organization became possible. *Noniyas* became economically independent of the *Thakurs* and forced labor, now illegal, could no longer be exacted through fear of losing rights to land. Landlord-tenant ties which held low castes in close relations with the *Thakur*-dominated village unit ceased. Also certain supportive functions of this relationship terminated, for traditionally the landlord loaned his tenants seed, cash, and implements; but now the ex-landlord denied assistance, for in his view the new government had "stolen" the land held by his lineage for perhaps 250 years.

We have only been able to mention very briefly some of the complex forces at work in Indian society during the past sixty years, but the force of these ideas and movements was to encourage a strong upwardly mobile movement among castes such as the *Noniya.* Until the post-independence period in Indian history, when steps were taken to alter some of the basic economic and political relationships prevailing in the countryside, the rural landed elite used traditional methods of keeping the low-caste labor force in check. As *Noniyas* now say of that period,

13 The traditional caste employment of *Noniyas* was in earth work (well-digging, tank construction) so that employment in moving of earth in the building of railway beds was a natural adaptation of their traditional caste work.

"We were under the eyes of the *Thakurs*." The marriage network existed, but then it impinged on fewer aspects of *Noniya* life with less force, for most *Noniya* settlements, as in Senapur, were very closely tied to a multi-caste village, in most cases dominated by a local *Thakur* caste. In the fluid and somewhat turbulent times since independence *Noniyas* have experienced a kind of freedom, and they say, "We are certainly still poor, but we are no longer so afraid." This freedom is accompanied by a loss of the security they once had through the landlord who was addressed in such kinship terms as "father" or "grandfather," and who in turn, addressed his tenants as "son."

A description has been given of how the marriage network has traditionally operated and how it is now fulfilling new functions which were formerly taken care of within the village unit.[14] In the broadly political and economic spheres affinal kin increasingly interact. Whereas formerly a *Noniya* tended to sit "at the feet" of his *Thakur* landlord seeking advice, now this relationship no longer exists and he is much more apt to talk with a respected caste brother in the *Noniya* settlement or to consult a trusted leader in one of the network settlements. The many Indian government programs intended to develop the material and social resources of village communities have been in the main channeled through the rural elite so that institutions which might on the surface seem to function to reintegrate the multi-caste village on a more equalitarian basis have in the main failed to do so.[15] *Noniyas* of Senapur tend to see these government programs as designed or at least administered in a way which makes the rich even more prosperous. They put added trust and warmth into their closer relationships with caste members in Senapur and in their wide network of affinal relationships in the countryside.

Bibliography

Bailey, F. G.
1957 *Caste and the Economic Frontier* (University of Manchester Press: Manchester).

Blunt, E. A. H.
1931 *The Caste System of Northern India* (Oxford University Press: Madras).

14 Viewing the structure diachronically we find that our data tend to bring some negative evidence to bear on Eggan's generalization about unilineal descent systems having the characteristic of "a relative inability to deal with change" although they provide for "social continuity" and for "transmission of property and position" (Eggan, 1955, pp. 494, 549). The marriage network of the *Noniyas*, reinforced in the Indian situation by the rules of caste, pumps standardized change through the group of villages linked in marriage. Perhaps the very specialization in structure—in this instance, the marriage network—provides a channel through which change may flow.

15 Tinker, 1959.

EGGAN, FRED
1955 "Social Anthropology: Methods and Results" (in Fred Eggan, ed., *Social Anthropology of North American Tribes,* pp. 485-551, University of Chicago Press: Chicago).
GHURYE, G. S.
1957 *Caste and Class in India* (Popular Book Depot: Bombay).
HUTTON, J. H.
1951 *Caste in India* (Oxford University Press: Bombay).
KARVE, IRAWATI
1953 *Kinship Organization in India* (Deccan College Post-Graduate and Research Institute: Poona).
LEWIS, OSCAR
1955 "Peasant Culture in India and Mexico: a Comparative Analysis" (in McKim Marriott, ed., *Village India,* pp. 145-170, American Anthropological Association Memoir 83: Menasha, Wisc.).
1958 *Village Life in North India* (University of Illinois Press: Urbana).
MAHAR, JAMES M.
1959 Unpublished paper on "Extravillage Visits and the Delineation of Unit Boundaries" (Read at the Annual Meeting of the American Anthropological Association, December, 1959).
MARRIOTT, MCKIM
1955a "Little Communities in an Indigenous Civilization" (in McKim Marriott, ed., *Village India,* pp. 171-222, American Anthropological Association Memoir 83: Menasha, Wisc.).
1959b "Social Structure and Change in a U. P. Village" (in M. N. Srinivas, ed., *India's Villages,* pp. 96-109, Development Department of West Bengal: Calcutta).
O'MALLEY, L. S. S.
1932 *Indian Caste Customs* (Cambridge University Press: Cambridge).
OPLER, MORRIS E.
1956 *The Extensions of an Indian Village* (Journal of Asian Studies, vol. 16, pp. 5-10).
SINGH, RUDRA DATT
1956 *The Unity of an Indian Village* (Journal of Asian Studies, vol. 16, pp. 10-19).
SRINIVAS, M. N.
1956 *A Note on Sanskritization and Westernization* (Journal of Asian Studies, vol. 15, pp. 481-496).
1957 *Caste in India* (Journal of Asian Studies, vol. 16, pp. 529-548).
TINKER, HUGH
1959 *Authority and Community in Village India* (Pacific Affairs, vol. 32, pp. 354-375).

CORNELL UNIVERSITY
ITHACA, NEW YORK

ANALYSIS OF MAIZE FROM THE FOUR BEAR SITE AND TWO OTHER ARIKARA LOCATIONS IN SOUTH DAKOTA

HUGH CUTLER AND GEORGE A. AGOGINO

ALTHOUGH the Arikara hunted bison, deer, bear, elk, and other animals, maize was the basic food staple. So important was maize to Arikara economy that their name in sign language was a hand motion representing the grinding of corn. However, up to this time little study has been made of the association of maize with this ethnic group. It is hoped that this paper will offer a small contribution on this subject and inspire further study.

Maize specimens were obtained during the excavation of three village sites in or close to the valley of the Missouri River as it flows from the northwest to the southeast through the state of South Dakota. The Four Bear Site, located in Dewey County, is the most northern of the three sites involved in this study. It was the analysis of samples from this site that initiated the study presented in this paper. For a more detailed description of this site, reference may be made to the main body of this report which will be published by the W. H. Over Museum of the State University of South Dakota.

The second site from which maize samples were obtained was the La Roche Site, located in Stanley County, just slightly south of the geographical center of the state. This site was first mapped and recorded in 1918 when geologist Freeman Ward and naturalist W. H. Over discovered the Indian village when traveling along the Missouri River by flat boat.[1] Unique as this type of site survey may seem, it was based on sound reason, since the majority of Indian sites lie in the river valleys and overland transportation to such locations was both difficult and hazardous.

Observations at this time indicated that the site was a large unfortified village, consisting of over one hundred lodge dwellings within an area of approximately eighty acres. Preliminary excavations were undertaken at this time, and further research was continued by E. E. Meleen shortly after World War II. Dendrochronology specimens examined by George Will of the North Dakota Historical Society indicated the village was occupied during the period 1443 to 1457. Since only four specimens were submitted for dendrochronological analysis it must be assumed that the occupation of the site may have extended on either side of this span.

The final site from which maize specimens was obtained for this study was a

1 Meleen, 1948.

small and badly weathered village site on the northeast side of Ponca Creek just north of the Nebraska-South Dakota state line in southern Gregory County. Intermittent excavations were conducted during 1958-59 by George Agogino, then at the State University of South Dakota. This site, identified as the Bonesteel Site, was so damaged by water erosion that it revealed little information other than that it was an Arikara village probably belonging to the same age period as the La Roche Site.

Most of the twenty charred fragmentary cobs secured at the Four Bear Site belong to the race of Northern Flint which were grown in prehistoric times to a limited extent and are still grown in the northeastern quarter of the United States, in adjacent Canada, and west into Kansas, western Oklahoma, and northward. Three of the Four Bear cobs show mixtures of Northern Flint with a race of corn from the Southwest which may have spread into the Plains region before the Northern Flint was used in this area.

Longley has published a valuable study of corn collections made over a period of many years for the United States Department of Agriculture.[2] These collections are now at the Missouri Botanical Garden where they are being studied as part of a survey of kinds of corn of the world. Included in this collection are five different collections of Mandan corn, varying from sweet and yellow flint corns, not greatly different from kinds grown farther east, to a yellow flour corn which resembles, in many respects, some soft yellow flour corns grown in the Southwest.

This diversity in the kinds of corn grown in the upper Missouri River region and the fact that the various kinds can be distinguished in carbonized fragments, is indicated by the diagrams of corn from the La Roche and Bonesteel Arikara sites in South Dakota. In both instances the Northern Flint race of corn, with 8 or 10 rows of grains and cupules usually wider than 7 mm, predominates, but there are a few cobs with more rows of grains and smaller cupules. These cobs represent older varieties related to kinds still grown in the Southwest and which probably were replaced in the Plains area by later introductions of the Northern Flint race. Popcorn grown on a very small scale by some Plains Indians probably represents the last remains of this older race of corn. It should be noted that this analysis is consistent with dendrochronology dates for the La Roche Site and the estimated contemporaneous age of the Bonesteel Site. Both sites are believed to be mid-fifteenth century in occupation and thus considerably older than the Four Bear Site.

Northern Flint ears may be flour or flint and the best known modern representative is the sweet corn, Golden Bantam, although the authors have never seen

2 Longley, 1938.

archaeological collections of Golden Bantam or any other sweet corn belonging to the Northern Flint race. In the northeastern states—New York, Pennsylvania, Massachusetts, Ohio—Northern Flint usually has eight rows of grains, occasionally ten, but rarely twelve or more. The kernels are squat and crescent shaped. The rows of grains are straight and usually cover the tip of the cob. The cob is hard and large, especially toward the base, and the ear shank is large. Brown and Anderson[3] studied and mapped the distribution of many collections of prehistoric corn in the eastern United States, but since their work was published, many more collections have been made available and the range of the crescent-seeded eight-rowed Northern Flints in prehistoric times can be extended over Missouri and into Oklahoma as well as Illinois, Wisconsin, Iowa, and Minnesota.

West of the Mississippi, Northern Flint corn is often mixed with an archaic race of corn identified as the "Pima-Papago" and grown over much of the Southwest and probably the Plains area in prehistoric times. This Pima-Papago race of corn[4] was grown by the ancient Mogollon, Hohokam, and Basketmaker cultures and probably was associated with the later phases of the still earlier Cochise culture. This Pima-Papago race of corn has been grown in recent times by the Pima-Papago, Mohave, the Maricopa Indians of the desert Southwest. Much of the corn grown in historic times by Plains Indians was a mixture of the Northern Flint with the older Pima-Papago race of corn. Even the corn grown by the 19th century Osage Indians of western Missouri was modified beyond the range of the Eastern forms of the Northern Flint.

Two characters—the number of rows of grains and cupule width—are useful to characterize these races and to indicate the amount of mixing which has taken place. In the eastern part of its range, Northern Flint is predominately eight-rowed, with a large hard cob. The cupules or sockets in which pairs of grains are borne, are large, often twelve or thirteen millimeters in width. The Pima-Papago race usually has more rows of grains and smaller cupules, and the Northern Flint of the Plains area shows contamination with this race by having more rows and smaller cupules than is standard in the northeast. In Figure 1 the average for the cobs found at the Four Bear Site that are considered good Northern Flint has been indicated at A, while the average of the three Four Bear cobs which have large amounts of Southwestern corn or of ancient Plains corn is at B. The average for all specimens from the Four Bear site is indicated on the chart by a heavy circle and a cross and is not greatly different from the average for a collection from a historic Osage Site in western Missouri. The slight difference can be readily

3 Brown and Anderson, 1947.

4 Anderson and Cutler, 1942; Carter and Anderson, 1945.

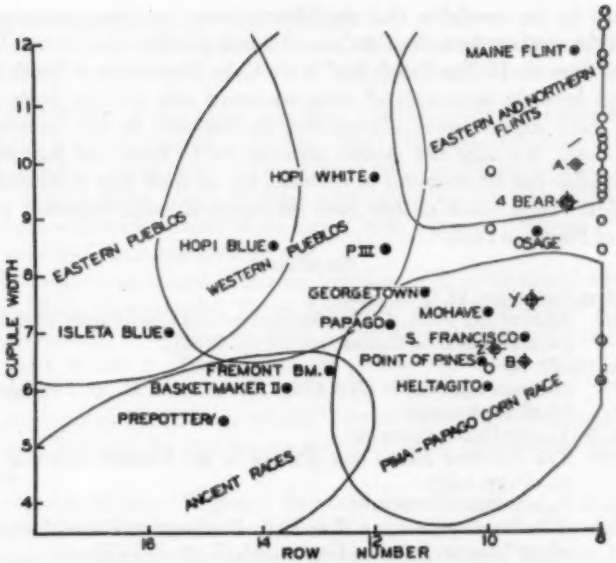


FIG. 1. Diagram showing number of rows of grains and cupule width of each cob of corn from the Four Bears Site (open circles) as compared with selected averages for some other varieties of recent and archaeological corn (solid dots). The average for all the Four Bear Site specimens is indicated "4 Bear." Average of the distinctly Northern Flint cobs is at A and the average for three cobs showing strong mixture with Southwestern or ancient varieties is at B. The average of all corn specimens from the La Roche Site is identified by the letter Y while the corn average from the Bonesteel Site is identified by the letter Z. This diagram is after one by Cutler in Breternitz (1957).

Basketmaker II, an average of several lots of Basketmaker II material excavated by Dr Earl Morris near Durango, Colorado. Fremont, an average for a selection of cobs from Yampa Canyon sites. Georgetown, an average derived from a large collection of cobs from the Georgetown Phase (500-700 AD) of Tularosa Cave, New Mexico. Hopi Blue, an average for several collections of the common blue flour corn of the Hopi. Hopi White, an average for several collections of the common white flour corn of the Hopi. Isleta Blue, an average for old-fashioned ears still grown at this eastern Pueblo. Maine Flint, an average for a common kind of Northern Flint. Mohave, the common, creamy white flour corn of the Mohave of a few years ago and still frequently grown near Parker, Arizona. Osage, an average from an Osage site of western Missouri (1806-1830 AD). Papago, an average for a small sample of the flour corn grown by the Papago for their own use, not very different in most respects from the corn of the Mohave Indians. Point of Pines, an average for some charred cobs from Room 70 of Arizona W:10:50, dated about 1250 AD. Prepottery (?-1500 AD), an average for many cobs from prepottery levels of Tularosa Cave, New Mexico. San Francisco (700-900 AD), an average for a large collection of cobs from the San Francisco Phase of Tularosa Cave, New Mexico.

explained by the possibility that the Missouri corn has been contaminated by some of the southern dents from the lower Mississippi valley. Similar corn has been reported from the Phillips Ranch Site[5] in the Oahe Dam region of South Dakota, although here the occurrence of more ten-rowed cobs and the lower average cupule width suggests more mixture with Southwestern or with ancient Plains races of corn. A similar corn mixture occurs at the La Roche and Bonesteel Sites and probably can be attributed to the older age of these sites in relation to the Four Bear village which exhibits more homogeneous maize specimens, predominately of Northern Flint.

Bibliography

Anderson, Edgar, and H. C. Cutler
1942 *Races of* Zea Mays: *I. Their Recognition and Classification* (Annals of the Missouri Botanical Garden, vol. 29, pp. 69-88).

Breternitz, D. A.
1957 *Heltagite Rockshelter (NA 6380)* (Plateau, vol. 30, pp. 1-16, Museum of Northern Arizona).

Brown, W. L., and Edgar Anderson
1947 *The Northern Flint Corns* (Annals of the Missouri Botanical Garden, vol. 34, pp. 1-28).

Carter, G. F., and Edgar Anderson
1945 *A Preliminary Survey of Maize in the Southwestern United States* (Annals of the Missouri Botanical Garden, vol. 32, pp. 297-322).

Longley, A. E.
1938 *Chromosomes of Maize from North American Indians* (Journal of Agricultural Research, vol. 56, no. 3, pp. 177-195).

Meleen, E. E.
1948 *A Report on an Investigation of the La Roche Site* (University of South Dakota Museum Archaeological Studies, no. 5, pp. 1-32).

Nickerson, N. H.
1954 "Vegetal Remains" (Appendix 1 to *Archaeological Investigations in the Oahe Dam Area, South Dakota, 1950-51,* Bureau of American Ethnology, Bulletin no. 158, p. 163).

Nickerson, N. H., and Ding Hou
1954 "Maize from the Dodd and Phillips Ranch Sites" (Appendix 6 to *Archaeological Investigations in the Oahe Dam Area, South Dakota, 1950-51,* Bureau of American Ethnology, Bulletin no. 158, pp. 180-181).

Missouri Botanical Garden
Washington University
Saint Louis, Missouri

University of Wyoming
Laramie, Wyoming

5 Nickerson, 1954; Nickerson and Hou, 1954.

CALENDAR ANIMALS AND DEITIES*

DAVID H. KELLEY

THE PURPOSE of this paper is to draw attention to certain similarities of sequence in names found in calendrical lists. The similarities considered are primarily found in animal names; however, some attention is given to other names, especially those of deities. Major emphasis is on calendrical lists from Eurasia and Mesoamerica, with some remarks on the named lunar nights of Polynesia.

The most important lists involved are:

1. The named lunar houses. These are sequences of 27 or 28 named constellations from China, Persia, Arabia, Egypt, India, and some other areas of Eurasia. The Indian material is found in markedly different forms from Jain and Hindu sources; there is also a Hindu list of the deities who ruled each of these constellations.

2. A sequence of 27-30 "lunar animals" known from China, Southeast Asia, and Greece. The Greek list includes one section of object names rather than animal names.

3. A sequence of named "nights of the moon" from Polynesia.

4. Several lists of 20 day-names, following one another in unbroken sequence, from various Mesoamerican groups such as the Aztecs, Mayas, Zapotecs, Mixes, Otomis, Mixtecs, et al. There is an Aztec list of the deities ruling these days.

The names are not cognates from one linguistic group to another; the meanings in some cases are easily translatable and are often the same from one group to another; in other cases, the meaning of the names is obscure or complete untranslatable. The Aztec list differs from the others in the fact that all of the names are of easily determined meaning, ten of the names being animals. This simplicity has usually been interpreted as indicating a relatively late standardization from earlier, more esoteric, lists. However, in Eurasia one finds that lists of animals, symbols, and deities coexisted, and this suggests that they might also coexist in Mesoamerica, whether one takes a diffusionist view or the view that parallel systems will tend to produce parallel results.

REMARKS ON PREVIOUS STUDIES

The first person to draw attention to similarities between names in Eurasia and Mesoamerica was Alexander von Humboldt. However, he was unable to show that any sequential correspondence was involved. A brilliant study by Graebner

* The final draft of this paper was prepared as part of a more detailed investigation supported by a research grant from Texas Technological College, 1960.

(1921), which has received very little attention in the United States, pointed out that there was some correspondence in sequence between Aztec and Southeast Asian lists. Cyrus Thomas (1894) pointed out some similarities between the Polynesian and Mayan calendars which he thought indicated the Polynesian origin of the Mesoamerican calendar, and the ultimate Asiatic derivation of both. Subsequently, a number of other scholars have worked on the problem, but most Americans who have studied New World culture history have ignored publications dealing with the Old World origin of the Mesoamerican calendars, or have been content to point out methodological weaknesses in these works and assume that the results were, therefore, invalid.

In a brief article, it is impossible to consider in detail the validity of the many arguments and rebuttals which have been presented, or to review the history of the many scholars who have previously reached conclusions similar to those presented here. Much data on associated material must be omitted, and the relationships and history of the Arabic, Hindu, and Chinese systems of lunar houses can not be examined. It will suffice to point out that the Arabic system is mentioned in the Koran; the Hindu lists are given in full in the *Atharva Veda;* and we know from documentary sources that the system of lunar mansions was in use in China at least by the late centuries BC, while internal astronomical evidence from China suggests the origin of the Eurasian system by about 2500 BC. The most recent and fullest summary of this material is in Needham.[1] I believe that the series of lunar animals associated with the lunar mansions has a related origin and similar history; however, many scholars disagree, and probably the view expressed by Weinstock (1950) is widely held. He maintains that the Chinese lunar animals derive from a Greek original in the early centuries AD.

Kroeber,[2] in denying the relationship of the Chinese twelve-animal system, the Western zodiac, and a system of thirteen animals among the Mayas writes "Genuine evidence for connection would be clean-cut in a closed system like this. It would consist of the number of symbols being the same; at least a majority of the symbols also being patently the same; and the order of the symbols being the same, or mostly the same." However, even within Asia, where the relationships are admitted by Kroeber, these criteria cannot be reconciled with the nature of these systems. That the number of symbols may vary in closely related systems is shown by the Hindu month sequence, in which every one of the twelve names of the month recurs as one of the twenty-seven lunar mansions, and by the Chinese animal sequence in which the twelve animals (forming the series to which Kroeber

1 Needham, 1959, vol. 3, sec. 20, seen in proof by courtesy of the author.
2 Kroeber, 1948, p. 547.

refers) all recur in the same order among the twenty-eight lunar animals. Saussure has shown the high probability of a change in the order of the Chinese lunar animals, and classical writers show that while four of the days of the week appear in the same order, three of them show marked variability. When the Vedic series of twelve animals is compared with the Chinese series, we find that eight of the names are the same and in the same sequence, but Crocodile substitutes for Dragon, Deer substitutes for Dog, Sparrow substitutes for Rooster, and Elephant substitues for Horse. Substitutions of conceptual equivalents which sometimes seem very far-fetched to us *do* occur. Unless the reason for them is very clear-cut in terms of the symbols of the local cultures concerned, they can never furnish proof of contact, but even a short series of sequential identities is adequate to prove statistically some sort of common origin, which can not be refuted because of such dissimilarities. A comparison of the Vedic series of twelve animals with the Chinese series of twenty-eight animals would start with the handicaps of not having the same number of symbols and of showing some differences in order. Moreover, although the majority of symbols are "patently the same," there are some differences, and a slight continuation of the process of differentiation would be ample to account for major dissimilarities. For a similar closed system, the alphabet, the number of symbols varies with remarkable freedom, the order has sometimes (though rarely) been completely changed, and the form of the symbols changes beyond recognition except to those who have carefully traced the changing forms through time and space.

DISCUSSION OF COMPARISONS

Table 1 shows a comparison of the twenty-eight Hindu lunar houses and their ruling deities with the Aztec twenty day-names and their ruling deities. There are some marked correspondences, extending to structural features and sequences. The Hindu list shows the storm god exactly half-way around the sequence from the water-goddesses, and the Aztec list shows water half-way around the sequence from rain. The Aztec sequence Death-Deer-Rabbit-Water shows a remarkable coincidence with the Hindu sequence, where Yama, the death god, is followed by Agni, god of fire, and he in turn by Prajapati, the high god (in deer shape) ruling the constellation called "the roe deer." Prajapati is followed by Soma, the moon god who, in turn, is followed by Rudra, the storm god. The correspondence of Soma and Rabbit, which at first sight seems the poorest, in fact involves a complex of similarities. Both in India and among the Aztecs, the figure in the moon is represented as a rabbit; Soma is not only the moon god, but has generally been stated in older authorities to be a type of liquor, although I have been informed

TABLE 1

Comparison of Aztec and Hindu calendar sequences*

Aztec deities ruling to days	*Aztec day names*	*Hindu deities ruling the lunar mansions*	*Hindu lunar mansions*
Tonacatecuhtli god of life	1. Cipactli, crocodile, swordfish	the Vasus, 9 earth gods	22. Śraviṣṭha, most famous
Quetzalcoatl, Feathered Serpent	2. Ehecatl, god of wind	Varuna, god of ocean	23. Satabhiṣaj
Tepeyollotl, jaguar god of mountains, with Tlazolteotl, old earth and moon goddess	3. Calli, house	Aja Ekapād, the one-footed goat Ahi Budhnya, the serpent of the deeps	24. Pūrva Bhādrapada 25. Uttara Bhādrapada
Ueuecoyotl, Old Fox, a dance god	4. Cuetzpallin, lizard	Pusan, the prosperer, charioteer of the sun	26. Revati, wealthy
Chalchiuhtlicue, Jade Skirt, a water goddess	5. Coatl, snake (also means "twin")	Aśvins, the twins	27. Aśvini
Tecciztecatl, the moon god, with Tezcatlipoca	6. Miquiztli, death	Yama, god of death Agni, god of fire	28. Bharani, bearer 1. Kṛittikā
Tlaloc, the rain god	7. Mazatl, deer	Prajāpati, high god in deer shape	2. Rohini, red, roe-deer
Mayauel, goddess of the moon, agave, and drunkenness	8. Tochtli, rabbit (figure in moon a rabbit)	Soma, god of liquor and the moon (figure in moon a rabbit)	3. Mṛigaśiras, stag's head
Xiuhtecuhtli, fire and year god, with Tlahuizcalpantecuhtli, Venus god	9. Atl, water	Rudra, "Red," the storm god	4. Ardra, moist
Mictlantecuhtli, god of death; Tonatiuh, sun god	10. Itzcuintli, dog	Aditi, mother of the gods, as a cow	5. Punarvasu, the two good (ones) again

Xochipilli, Flower Prince, a sun god	11. Ozomatli, monkey	Brhaspati, planet Jupiter, teacher of gods	6. Puṣya, flower
Patecatl, the pulque and medicine god with jaguars and eagles	12. Malinalli, 'twisted,' name of an herb	Ahi, the serpents Pitrs, the fathers, ancestral dead	7. Asleṣa, embracer 8. Magha, generous
Itztlacoliuhqui, god of cold and stones	13. Acatl, reed	Bhaga, epithet of Savitr Aryaman, "comrade"	9. Pūrva-Phalguni 10. Uttara-Phalguni
Tlazolteotl, moon and earth goddess	14. Ocelotl, ocelot	Savitr, a sun god	11. Hasta, hand
Xipe Totec, god of flaying (represented with a feathered serpent, cf. 2)	15. Quauhtli, eagle	Tvaśtr, chief of craftsmen Vayu, wind	12. Chitra 13. Svāti
Itzpapalotl, Obsidian Butterfly, with death markings	16. Cozcaquauhtli, Vulture	Indra	14. Viśākha
Xolotl, dog of the underworld with Tlalchitonatiuh, Earth-Sun	17. Ollin, movement, earthquake	Mitra, sun and fire god Sakra, epithet of Indra	15. Anurādha 16. Jyeṣṭha
Chalchiuhtotolin, Jewel Bird (Turkey)	18. Tecpatl, flint knife	Nirtti, "decease"	17. Mūla
Chantico, or Quaxolotl, fire goddess	19. Quiauitl, rain, or Ayotl, turtle (Pipil)	Apaḥ, the water goddesses Visvédevah, the all gods	18. Pūrva-Aṣāḍha 19. Uttara-Aṣāḍha
Xochiquetzal, Flower Quetzal, the young moon goddess	20. Xochitl, flower	Brahma Visnu, whose head became the sun	20. Abhijit, victorious 21. Sravana, ear

* Diacritical marks have been omitted in part from the tables because of limitations of type available.

that it was actually probably a drug. The Aztec goddess Mayauel, who rules the day Rabbit is both a moon goddess and a goddess of drunkenness. Moreover, rabbits were a symbol of drunkenness to the Aztecs.

Allen[3] tells how Buddha was a hare in an early stage of his existence. The hare was asked by Indra, disguised as a beggar, to give him some food. Unable to find any food, he cast himself into the fire to become Indra's supper and, as a reward, Indra put him in the moon.[4] Aztec and Cora stories similarly tell how an animal or a deity jumped into the fire and emerged as the moon, although the general tenor of the stories is less moralizing and more cosmological.

The correspondence between the Aztec Coatl, which means "snake" or "twin" and the Hindu Asvins, or twins, at first seems coincidental, as the meaning "snake" is found in other Mesoamerican lists, while the twin interpretation does not occur. However, the equation of the Asvins with their Greek counterparts, Castor and Pollux (Polydeuces), has long been accepted and Graves[5] refers to the appearance of the Greek Twins as serpents.The Aztec Quetzalcoatl, Feathered Serpent, is one of twin deities in some accounts, and both meanings of "coatl" may well be intended. (See also the discussion of the correspondence of Polynesian *Filo with Mayan Chicchan.)

Of the elements of the Aztec day name sequence death-deer-rabbit-water which show such similarity to the Hindu, all recur in Eurasia and some recur in the New World as constellation identifications, whether within the system of lunar mansions or outside of it. The constellation ruled in India by Yama, god of death, includes the star known to the Arabs (and ourselves) as Algol ("the Ghoul") and called by the Chinese "Heaped-up Corpses."[6] Part of Orion was known to the Greeks as a doe, and identification as a stag is widespread in southeast Asia. In Mexico, the Tepehuan believed that the three stars in the Belt of Orion are deer[7] and deer are also associated with Orion by Algonkins, Paiute, Zuñi, and others. The equatorial extension of our constellation Lepus, the Hare, overlaps the equatorial extension of the lunar house ruled by Soma. The Hindu lunar mansion of Ardra ("moist") is ruled by Rudra the storm god, and is in Orion; the Chinese constellation called "the reservoir of water" includes some of the stars of the equivalent Chinese lunar mansion, while another constellation called "the accumulated waters" is nearby in Gemini.[8]

The Hindu constellation Pusya, Flower, shows no direct connection with the Aztec day-name Ozomatli, Monkey, but the deity ruling the Aztec day is called

3 Allen, 1899, p. 266.
4 For another version cf. Paul Thomas, n.d., p. 120.
5 Graves, 1957, vol. 1, p. 252.
6 Schlegel, 1875, p. 350.
7 Lumholtz, vol. 1, p. 436.
8 Schlegel, 1875, pp. 419-420.

Xochipilli, Flower Prince. There are also two cases in which the mechanical line-up of the lists makes Aztec day-names correspond to similar Hindu constellations in the same part of the sky as the equivalent lunar mansions. Aztec *cipactli* is usually represented in the Mesoamerican codices as a crocodile without a lower jaw and with a recurved upper lip, although the equivalent day is also sometimes referred to as a swordfish. The corresponding constellation is Capricorn. In India, the Greek concept of Capricorn as the Goat-Fish replaced the Hindu concept of Capricorn as the *makara*, a crocodile with a recurved upper lip, in about the first century AD.[9] The earlier Greek concept of Capricorn was as a swordfish.

Finally, Aztec Cuetzpallin, "lizard," corresponds to the Hindu lunar mansion, Revati, which means "wealthy." Revati is in Pisces, and Al-Beruni says that the Hindu constellation of the Great Lizard is found in Pisces. In Mexico, the lizard was a symbol of abundance (or "abundance of water"[10]).

Table 2 shows the sequence of Greek and Chinese lunar animals lined up against the Aztec. It should be emphasized here that the lunar animals are not directly connected with the lunar mansions, since the animals move in the opposite direction through the mansions, and shift from one to another, but the similarities between the lists of lunar animals and of lunar mansions seem to me adequate to indicate that there was some basic conceptual unity between the lists. In comparing the Greek and Chinese lunar animals, certain correspondences indicate clearly the importance of considering the symbolic value of the animals in the local culture. Thus, the 12th, 13th, and 14th animals of the Chinese lunar list are crow, cock, and pheasant. All these animals are repeatedly and explicitly associated with the sun in China. The assumed Greek equivalents, cat, lion, and leopard are all felines and the lion, at least, was associated with Helios, the sun-god.[11] It is worth noting that the Chinese association of the crow and the sun recurs in Greece, where another sun-god, Apollo, is closely associated with, and even changes into, a crow.[12] The last seven names of the Greek list are not animals and hence cannot be directly compared to the Chinese. Of the remaining twenty Greek names, six seem closely comparable to their Chinese equivalents (Bull/Bull; Dog and Wolf/Fox; Snake or Dragon/Dragon; Horse/Horse; Chamois and Male Goat/Ram; Baboon/Big Monkey).

In comparing the Aztec list with the Chinese, only the ten animals of the twenty-name Aztec list can be directly compared. Of these, four appear in the same sequence in both Aztec and Chinese lists, i.e. Snake, Deer, Dog, and Monkey. The "Wild Dog" of the Chinese lunar animals is also identified as the star Sirius,

9 Cf. Lindsay, 1951.
10 Thompson, 1950, p. 75; Seler, 1904, p. 41.
11 Graves, 1957, p. 31.
12 *Idem*, pp. 38, 134.

TABLE 2

Greek and Chinese lunar animals and the Aztec day sequence

Greek lunar animals	*Chinese lunar animals*	*Aztec day-names*
4. Scarab beetle	23. Unicorn	1. Crocodile, or swordfish
5. Hawk	24. Leopard	
6. Crab	25. Tiger	
7. Dog	26. Fox	2. Wind
8. Wolf	27. Hare	
	28. Badger	3. House
9. Snake, or Dragon	1. Dragon	4. Lizard
	2. Boa	5. Snake
	3. Earthworm	
	4. Serpent	
10. Horse	5. Little Deer	6. Death
11. Chimaera	6. Horse	7. Deer
12. Thermonthis	7. Big Deer	8. Rabbit
13. Chamois	8. Ram	9. Water
14. Male goat		
	9. Wild Dog	10. Dog
	10. Little Monkey	
15. Baboon	11. Big Monkey	11. Monkey
16. Cat	12. Crow	
17. Lion	13. Cock	12. Twisted, an herb
18. Leopard	14. Pheasant	13. Reed
		14. Ocelot
19. Field Mouse		
20. Deer (or horse)		
	15. Dog	15. Eagle
	16. Wolf	
21. Multiform Virgin	17. Anteater	16. Vulture
(or dragon)	18. Pig	
22. Lamp		
23. Lightning	19. Swallow	17. Earthquake
24. Wreath (or lion,	20. Rat	
or crab)	21. Bat	18. Flint
25. Sceptre (or		19. Rain
wolf-bitch)		
26. Boy		
27. Key		
1. Ox	22. Bull	20. Flower
2. Vulture		
3. Bull		

our "Dog-star," which occurs in the stellar sequence at a point corresponding to the position which the Aztec "dog" must have if the previous line-up with the Hindu constellations is correct. If the equivalence of Aztec "Lizard" and Hindu "Great Lizard" is accepted, then it provides a plausible transition to "Dragon" which has many characteristics of either lizard or crocodile, and is certainly in China a symbol of "abundance of water" as the lizard is in Mesoamerica. If acceptable, this would make five correspondences between the Aztec and Chinese lists, i.e. only one less than between Greek and Chinese. There is only one possible correspondence between the Aztec and Greek lists which is not shared between Greek and Chinese directly, and that is the correspondence between the Aztec day "Ocelot" and the Greek sequence Cat-Lion-Leopard.

Table 3 is based on the work of Hugh Moran. He claims that the system of lunar houses was the original from which the alphabet was derived. The claim was based on a comparison of the meaning of the names of the letters of the alphabet with the meanings of the names of the Chinese lunar mansions, with which he was most familiar. At the time I became familiar with his work, I had already lined up the Aztec day-names against the lunar houses of the Hindus. Since the correspondence of the Hindu and Chinese lunar stations has been long determined on the basis of the general identity of the constellations composing them, and since the correspondence of the Aztec day-name list with the Maya day-name list has also been long-determined on the basis of about ten obvious correspondences in meaning and other conceptual equivalences, the comparison of the Semitic alphabet with the Maya day-name sequence could be made as a purely mechanical matter. This comparison gave the remarkable results shown. Not only are the similarities shown extremely unlikely to be due to random assortment, but they appear most clearly in the same part of the lists in which the Aztec and Hindu lists show the greatest similarity. I subsequently found that this resemblance had been noted by Werner Wolff, but he so obscured the basic data with fantastic psychological explanations and weirdly improbable readings of the hieroglyphs that the importance of this equation was not recognized.

The alphabetic sequence kaph-lamed-mem shows particularly close similarities to the Mayan day-name list. It should first be noted that in the Yucatec Maya list, the name corresponding to kappa/kaph is Manik. Neither the meaning nor origin of this name is known. The glyph is a hand, and McQuown[13] gives Yuc. *k'áṗ* and proto-Mayan **q'waṗ* with the meaning "arm." The conventional Yucatec spelling of the term is *kab*, and the Yucatec meaning includes not only "arm," but also "hand" and even "finger." The correspondence to Hebrew kaph is

13 McQuown, 1955, p. 504.

TABLE 3

Chinese lunar mansions, the alphabet, and Maya day-names

Chinese lunar mansions	*The Hebrew alphabet*	*The Greek alphabet*	*Yucatec Maya day-names*
11. Hsu, empty	Gimel, camel cf. gamal, to ripen	Gamma	1. Imix, the earth crocodile (cf. Mox, beetle)
12. Wei, dangerous	Daleth, Heb. dal, door	Delta	2. Ik, wind, breath, life
13. Shih, stop, house	Heh	Epsilon	3. Akbal, night
14. Pi, a wall (of the house, 13)	Waw, a hook, pin	Di-gamma	
15. Kuei, jade sceptre	Zayin	Zeta	4. Kan, ripe, ruled by maize god
16. Lou, a woman confined	Heth	Eta	5. Chicchan, Twisted Snake, day of the rain serpents
17. Chou, Wei, abdomen	Teth, cf. tethe, to sweep	Theta	6. Cimi, day of the death god
18. Mao	Yodh, a hand (cf. following)	Iota	
19. Pi, finished, ended, "Star of the Hunter"	Kaph, hand, palm	kappa Assyr. kappu, hand	7. Manik, cf. Ceh in non-Yucatec sources
20. Tsui, egret feathers	Lamed	Lambda Assyr. lamadu, to learn	8. Lamat, cf. Tzel. lambat
21. San, three	Mem, the waters	Mu Assyr. mu, waters	9. Muluc, cf. Ixil mu, hidden. Ruled by xoc shark god.

22. Ching, well, virginity	Nun, fish, dragon, serpent	Nu	10. Oc (coyote in other Maya languages), day of the dog of the underworld
23. Kuei, ghost	Samekh cf. Syr. s'mach, to support	Xi	11. Chuen, monkey
24. Liu, willow	Ayin, eye, spring	O-micron	12. Eb, twist, points
25. Hsing, star, warp thread	Peh, mouth	Pi	
26. Chang, Ts'ang, to shoot an arrow	Ts'ade, an arrow		13. Ben
27. I, wings	Koph, surround, wound, mutilate	Koppa	
28. Chen, a carriage, to revolve, distressedly	Resh, cf. rosh, head	Rho	14. Ix, day of the jaguar
1. Chiao, Kio, a horn	Sin, tooth (?) (cf. Sumerian Sin, moon god)	Sigma	15. Men day of old moon goddess ?
2. Yuan, head, source	Taw	Tau	
3. Ti, Shih		U-psilon	16. Cib, day of malignant Bacabs, supports of heaven ?
4. Fang		Phi	17. Caban, day of young earth and moon goddess
5. Hsin, heart		Chi	
6. Wei, end, tail		Psi	18. Etz'nab, flint knife
7. Chi		O-mega	19. Cauac, storm—day of rain dragons
8. Tou			
9. Niu, ox	Aleph, a bull	Alpha	20. Ahau, lord—day of the sun god
10. Nu, woman	Beth, house, woman	Beta	

close, but one would expect simple *k* in the Maya rather than *k̓*, and McQuown's reconstruction of an internal *-w-* is difficult to reconcile with the Hebrew forms. However, kaph means "hand, palm," and the letter *k* is commonly supposed to represent a hand, so there is an agreement between the two lists as to this. It should be noted that there is no evidence that the "Manik" glyph has the phonetic value *kab*. I am inclined to follow Knorozov[14] in believing that this glyph has a phonetic value corresponding to Cholan *che* both initially and finally, and to Yucatec *ce* initially and *che* finally. Knorozov indicates to my satisfaction that the glyph has the meaning deer (Yucatec *ceh*).[15] This is further supported by the fact that all the other Maya lists of day-names give the name of this day as "deer" in some form cognate with Yucatec *ceh*. Knorozov assumed from this that the original phonetic value was *che*, but McQuown has written me that it is phonologically more plausible to assume an original *ke* (conventionally written *ce*) retained only in Yucatec and only initially. Thus we have in Mayan a hand glyph, probably pronounced *ke*, corresponding to the Hebrew letter *k*, probably representing the hand, but pronounced kaph.

The following letter of the alphabet is the Hebrew lamed, and the Greek *lambda*, showing an intrusive *b*. The following Yucatec day name is *lamat*, which I have not located in other lists. Seler[16] says that the name also appears in Tzental-Zotzil in the form *lambat*, likewise showing an intrusive *b* sound. No adequate translation has been proposed, either for the Hebrew or for the Mayan names. Since Mayan has no *-d*, the final *-t* found is the expectable correspondence for any word ending in *-d* borrowed from another language.

The last Mayan glyph of this group of three is shown as a circle, and the Yucatec name *muluc* is given to it; however, no other Mayan language gives a final *-c* for this day-name, having instead *mulu*. The Maya day is ruled by the *xoc* shark, and the equivalent Aztec day is "water." The Hebrew form *mem* means "waters"; the Greek form *mu* can not have been directly borrowed from this, but probably comes from some other Semitic language, such as Assyrian, where *mu* means "water." Both the meanings and pronunciations seem remarkably similar. The final *-lu, -luc* of the Mayan day-names remains unexplained but may be due either to compounding or to folk-etymology. A possible connection with Ixil *mu*, "hidden" or Yucatec *mucul*, "hidden," may have arisen in Maya due to similarities of sound, or may reflect some earlier conceptual connection.

14 Knorozov, 1955.

15 Probative context, *Madrid Codex*, p. 91a (Villacorta and Villacorta, 1930).

16 Seler, 1904, p. 44.

The letter *p*, Hebrew *peh*, "mouth," is said to be a drawing of a side view of a mouth (although the resemblance is not very striking) and the equivalent Maya day, Eb, is drawn in early forms as a jawbone. This is by no means an overwhelming resemblance, and the phonological correspondence between the two is also not particularly strong. There are no other direct correspondences between the two lists, of the sort which I wish to consider in this paper.

Table 4 shows a comparison of the Mayan sequence of day-names with a series of twenty names of nights of the moon from Polynesia. It will be noted that the twenty names are spread over thirty nights by the device of giving the same name to several sequent nights in some cases. The particular Polynesian list given is Tahitian, collected by Stimson, and picked because I believe it corresponds precisely to the original form of this list in Polynesia. Kenneth Emory reconstructs an original list with two more names than I have shown here, but generally very similar. Some of the semantic correspondences shown in Table 4 are probably due to chance, but the probability that all of them would recur in the correct sequence is extremely small, and seven of the names show such correspondences. Common origin subsequent to the period of presumed Eurasiatic-Mesoamerican contact is indicated by the fact that both the Polynesian list and the Mesoamerican lists are of twenty names, and by many specialized mythological correspondences which can not be considered here, except very summarily. The Polynesian list suggests a possible origin for the fact that the twenty-day periods in Mesoamerica are called "moons" and suggests that the cycle of thirteen times twenty, basic to the Mesoamerican calendar, may have originated as a cycle of thirteen moons of twenty-eight days each, giving a 'year' of 364 days—a type of calendar known in Southeast Asia; each of the moons would have contained only twenty names, spread over the twenty-eight days in the way that the Polynesian names are spread over thiry or thirty-one days.

Some of the relationships between the Mayan and Polynesian sequences decidedly illuminate relationships in the other lists. Thus the Mayan day name Chicchan corresponds to Proto-Polynesian *Filo, and Mayan Eb corresponds to Polynesian Hua. Chic- means "twist" and Chicchan is "twisted serpent"; eb also means "twist," as does the equivalent Aztec day, malinalli. The Hindu lunar stations which I have equated with malinalli are ruled by the Sarpas, or serpents, and the Hindu equivalent of Maya Chicchan, the "twisted serpent" is ruled by the Asvins, or twins, divine physicians. *Filo, which means "twist, thread," is the name of the Polynesian god of thieves, and Maori mythology makes him the twin brother of Hua. In Samoa, Filo is a name given to Castor (one of the stars

TABLE 4

Comparison of Maya day-names with Polynesian night-names

Maya day-names	*Polynesian named nights of the moon (Tahiti)*
1. Imix	28. Ro'ō-nui
2. Ik, wind, breath, life	29. Ro'ō-māuri (PP *mauli, life, soul)
3. Akbal	30. Mutu
4. Kan, ripe (cf. Az. lizard)	1. Tireo (cf. Mao. teretere, a type of lizard; Mng. aka-tere, to become ripe)
5. Chicchan, twisted serpent, rain gods, cf. 12	2. Hiro-hiti (cf. PP. *Filo, twist, thread, name of god of thieves, some rain associations; Mao. Hiro, brother of Hua, 13)
6. Cimi, death	3. Hōata
7. Manik (in other dialects, Ceh, deer)	4. Hamiama-mua 5. Hamiama-roto 6. Hamiama-muri
8. Lamat, believed to be the day of the Venus god	7. Tamatea-mua 8. Tamatea-roto 9. Tamatea-muri — Tamatea, a fire god, associated with the origin of human sacrifice in Tahiti, said to rule the dawn in New Zealand. Tama, son; tea, white
9. Muluc, cf. Ixil mu, Yuc. mucul, hidden—day ruled by a shark god	10. Huna, hidden — In mythology, applied to the Hidden Land of Tane, the Milky Way, identified also as a giant shark.
10. Oc	11. 'Ari
11. Chuen	12. Maharu
12. Eb, twist—probably day of a malignant rain god	13. Hua (In Maori belief, Hua was a brother of Hiro, 2, above)
13. Ben	14. Māitu (cf. PP *Atua, gods)
14. Ix	15. Hotu
15. Men the old moon goddess?	16. Māra'i (PP *ma-langi, "from heaven")
16. Cib (thought by Thompson to be the day of the Bacabs, props of heaven)	17. Turu, prop (a name for the mythical props of heaven)

17. Caban or *Noh in other Maya languages—meanings include medicine, strong, a plain—ruled by Ix Chel, moon, medicine and rainbow goddess	18. Rā'āu-mua 19. Rā'āu-roto 20. Rā'āu-muri	(PP *rakau, medicine; other meanings include strength, a plain—an alternate name is *kaniva, rainbow)
18. Etz'nab, flint knife—in one Maya language, the equivalent day name is translated "prayer"	21. 'ore-'ore-mua 22. 'ore-'ore-roto 23. 'ore-'ore-muri	(PP *kole, nothingness—in one case has the meaning "prayer")
19. Cauac, storm	24. Ta'aroa-mua 25. Ta'aroa-roto 26. Ta'aroa-muri	(PP *Tangaloa, an ocean god)
20. Ahau, derived from ah, male—means "lord," refers to the Sun God	27. Tāne, male	Name of a god associated with the sun

of the constellation of the Twins or Gemini) and among the Maoris Whiro (from *Filo) was the name applied to the planet Mercury. The Greeks applied the name Apollo both to the planet Mercury and to the star Castor, while the Roman Mercurius, god of thieves, was also god of the planet Mercury. Al-Beruni gives the meaning of the sixth lunar station of the Arabs, two stars in Gemini, as "to wind and twine one thing around another." It is not impossible that the Polynesian word *Filo is ultimately a borrowing from some cognate of the similar Latin form. Apollo was a god of medicine, as were the Asvins, and Patecatl, god of pulque and medicine, was the Aztec deity ruling the day malinalli. If any of these similarities reflect a common historical origin, the history of the cults involved must be very complex and difficult to unravel, and it is unlikely that anyone can make systematic comparisons of this sort without falling into some errors of interpretation.

However, certain comparisons seem valid. It has generally been supposed that a star called "Vulture" or "Buzzard," which marked the beginning of a month in some calendars of the American Southwest[17] is Altair, which forms part of the old Latin constellation of the Vultur volans, or "Flying Vulture" (also Hebrew and Arabian).[18] The Aztec day Vulture corresponds to the Polynesian Turu, and Makemsón gives this as a name for Altair in Pukapuka. The name *turu* means "prop" and refers to the mythical props of heaven, who correspond closely and in detail to the Bacabs. Thompson[19] suggests that the Bacabs are the

17 Cf. Spier, 1955.

18 Cf. Allen, 1899, p. 57.

19 Thompson, 1950, pp. 84-86.

deities of the Maya day Cib, corresponding to the Aztec Vulture. The Maori identify Poutu-te-rangi, the Pillar of Heaven, a star which marks month beginnings for them, sometimes with Antares, sometimes with Altair. The conceptual similarity of Poutu-te-rangi to the *turu* and the Bacabs is quite close.

The accompanying Table 5 shows that half of the names of Aztec days recur in Eurasia in correct sequence as constellation names. It seems to me that there can be little doubt that some sort of common conceptual scheme underlies these many different sequences, and that it is much more likely that this scheme has had a common historical origin instead of a common psychological origin. There is obviously room for widespread divergence of opinion as to possible explanations of the data. A great many anthropological problems need reappraisal in the light of these data and the extensive supplementary material, not touched on here.

THE FUNDAMENTAL PROBLEM

The historical problems of "who?" and "when?" need examination both for the original system of lunar houses, and for the subsequent derivations. Conceptual explanations of how and why an alphabet could arise from a sequence of star names are badly needed, since I believe the accompanying data furnish strong support for Moran's view. It has usually been believed that the alphabet was a "practical" invention, spread by traders and merchants, although Graves and Stucken have somewhat anticipated views suggested here. The possibility that these merchants were mariners who knew and used a set of guiding stars, and then adjusted the symbols for these stars into an alphabet should be considered. The sequence of symbols has often been supposed to be arbitrary, and only in the wild fantasies of James Churchward has the alphabet been made to tell a full story, but it has been supposed by more serious scholars that the signs of the Zodiac tell of the adventures of Hercules or Gilgamesh, and the possibility should be examined in the light of other mythologies.

Both diffusionists and functionalists seem to me to have misinterpreted the problem of widespread similarities such as have been presented in this paper. The argument has usually seemed to revolve around whether the human mind was inventive enough to turn out such similarities more than once. To me, the real problem is why such a small percentage of the possible "answers" appear. Restriction of ideas seems more easily explainable by diffusion, particularly when many possible alternates seem never to have occurred in any society. Functionalist interpretations through time must be dependent on a correct knowledge of what actually happened historically, and this should be determined by study of particular cases

TABLE 5

Comparison of Aztec day-names with Eurasian constellations

1. Crocodile	Capricorn, Hindu *makara*, originally a crocodile, subsequently more like the Goatfish.
2. Wind	
3. House	Great Square in Andromeda, Chinese "Temple of Purifications" or "Palace of Darkness"
4. Lizard	Pisces, the Fishes, partly correspond to the Hindu "Great Aquatic Lizard"
5. Snake	
6. Death	Algol—Arab Rā's al Ghūl, the Demon's Head—Greek, part of Medusa's Head—Heb. Rōsh ha Sāṭān, Satan's Head—Chinese Tseih She, the Piled-up Corpses
7. Deer	Hindu—Hyades, Rohini, the roe-deer; Orion's Belt, Mṛigaśiras, Stag's Head
8. Rabbit	Lepus, the Hare—cf. Chinese star, 766 Tauri, called "the Moon."
9. Water	Chinese—Gemini, "the accumulated waters"; 4 stars of Orion, "the reservoir of water"; Procyon and certain stars in Canis minor and Gemini, "the northern river" and "the southern river"—Hindu lunar constellation Ardra, "moist"; ecliptic here crosses the Milky Way, River of Heaven.
10. Dog	Sirius, the Dog Star—called by the Chinese, "the Celestial Jackal"—cf. also our constellations of Canis Major and Canis Minor, the Big Dog and the Little Dog.
11. Monkey	
12. Twisted	
13. Reed	
14. Ocelot	Cf. our constellation Leo, the lion
15. Eagle	
16. Vulture	
17. Earthquake	
18. Flint	
19. Rain (Pipil, Turtle)	Arabic, Greek, Chinese constellation "the tortoise," corresponding approximately to our Lyra
20. Flower	

rather than by *a priori* arguments. The material furnishes an abundance of data on the relative degree of persistence of formal and functional elements in different societies and different systems. It should be possible to learn something of the regularities governing such persistence, although they seem to be different for different systems, and even for different parts of a single system. I believe it will also be possible to learn some things about the nature of psychological equivalences made in transferring a system from one culture to another, or in adapting a formal system to a new purpose within a culture. To me, this last type of study could be the most important of all, in helping to determine what factors aid communication, and what factors transform information and impede communication.

In conclusion, at the present time, I favor a Eurasian origin of Mesoamerican calendars and I think that the Mesoamerican day-names have their antecedents in Old World constellation names. Specifically, I postulate that a group from India carried a variant of the system of lunar mansions across the Pacific into Mesoamerica between the 7th and 4th centuries BC. Either before leaving India or shortly after arriving in the New World, they selected twenty of the twenty-eight names of the constellations of the system of lunar houses, and spread them over the nights of a sidereal lunar month, calculated as an even twenty-eight nights, ignoring fractions. This system spread back into Oceania in the late centuries BC. where it was further modified by changing from a sidereal lunar month to a synodic lunar month. In Mesoamerica, the twenty names of the revised constellation list became an endless series of repeating days, losing all direct connection with constellations, and the thirteen month deities (also associated with constellations) became the gods of the numbers one to thirteen, associated with the thirteen different heavens. Without the presentation of much supplementary data, this explanation is bound to seem more complex than is necessary.

I have considered and rejected the possibility of a coastal or land route from Asia across Bering's Strait, but the possibility can not be entirely rejected, nor can the possibility of common reworking of a known ancient system of constellations be excluded. My reasons for rejecting these explanations could not be presented here without unduly lengthening this paper. A spread across the South Atlantic from Africa is possible, and I have not examined the pertinent African material in any detail. Solely on the basis of the calendrical and geographical evidence, the explanation that a system spread from India into Polynesia and thence into Mesoamerica would seem more plausible, but a sizeable body of evidence indicates that the Polynesian languages contain extensive borrowings from some Uto-Aztecan language (particularly in the domain of religious and magical vocabulary) and I find it difficult to believe that these are two completely separate

problems. For a further discussion of the apparent special relationships between Polynesia and Mesoamerica, see Kelley, PhD thesis.

Bibliography

Al-Beruni [ca. 1030 AD]
1914 *Alberuni's India* (Translated and edited by Edward C. Sachau, reprinted, London: Kegan Paul, Trench, Trubner).

Allen, Richard H.
1899 *Star-names and their Meanings* (reprinted 1936, New York: G. E. Stechert).

Brown, Robert Jr.
1899/1900 *Primitive Constellations* (London: Williams and Norgate).

Emory, Kenneth P.
Unpub. *Eastern Polynesia, its Cultural Relationships* (Doctoral dissertation, Yale University, submitted 1946).

Graebner, Robert F.
1921 *Alt-und neuweltliche Kalender* (Zeitschrift für Ethnologie, vol. 52, pp. 6-37).

Graves, Robert
1948 *The White Goddess* (New York: Creative Age).
1957 *The Greek Myths* (reprint, New York: George Braziller).

Hopkins, E. Washburn
1915 *Epic Mythology* (Grundriss der Indo-Arischen Philologie und Altertumskunde, vol. 3, part 1, B).

Humboldt, F. H. Alexander von
1814 *Researches concerning the Institutions and Monuments of the Ancient Inhabitants of America* (Translated by Williams, in *Collected Works*, vols. 13, 14, London).

Kelley, David H.
Unpub. *Our Elder Brother Coyote* (Doctoral dissertation, Harvard University, submitted 1957).

Knorozov, Yurii
1955 *La Escritura de los Antiguos Mayas* (Authorized translation from the Russian, Academy of Sciences, USSR, Moscow).

Kroeber, A. L.
1948 *Anthropology* (revised edition, New York: Harcourt, Brace).

Lindsay, J. H.
1951 *The Makara in Early Chinese Buddhist Sculpture* (Journal, Royal Asiatic Society, vol. for 1951, pp. 134-138).

Lumholtz, Carl
1902 *Unknown Mexico* (2 vols., New York: Charles Scribner's Sons).

MacDonnell, A. A.
1897 *Vedic Mythology* (Grundriss der Indo-Arischen Philologie und Altertumskunde, vol. 3, part 1, A).
1927 *India's Past* (Oxford: Clarendon).

McQuown, Norman A.
1955 *The Indigenous Languages of Latin America* (American Anthropologist, vol. 57, pp. 501-570).

Makemson, Maude W.
1941 *The Morning Star Rises* (New Haven: Yale University Press).

Menon, Cherubala Pathaypura Sivarama
1932 *Early Astronomy and Cosmology* (London: G. Allen and Unwin Ltd.).

Moran, Hugh A.
1953 *The Alphabet and the Ancient Calendar* (Palo Alto: Pacific Books).

Needham, Joseph
1959 *Science and Civilization in China* (vol. 3, section 20, seen in proof, by courtesy of the author).

Popol Vuh
1947 *Popol Vuh: las Antiguas Historias del Quiche* (Translated by Adrian Recinos, Mexico: Fondo de Cultura Economica).

Saussure, Leopold de
1930 *Les origines de l'astronomie Chinoise* (Paris: Librairie orientale et américaine Maisonneuve frères).

Schlegel, Gustave
1875 *Uranographie Chinoise* (La Haye: Librairie de M. Nijhoff).

Seler, Eduard
1902-23 *(Gesammelte Abhandlungen zur) Amerikanischen Sprach-und-Alterthumskunde* (5 vols., Berlin: A. Asher).
1904 "The Mexican Chronology" (in *Mexican Antiquities*, Bulletin, Bureau of American Ethnology, no. 28, Washington).

Spier, Leslie
1955 *Mohave Culture Items* (Bulletin, Museum of Northern Arizona, no. 28, Flagstaff).

Stimson, J. Frank
1928 *Tahitian Names for the Nights of the Moon* (Journal, Polynesian Society, vol. 37, pp. 326-337).

Stücken, Eduard
1913 *Der Ursprung des Alphabets und die Mondstationen* (Leipzig: J. C. Hinrichs' Buchhandlung).

Thomas, Cyrus
1894 *The Maya Year* (Bulletin, Bureau of American Ethnology, no. 18, Washington).

Thomas, Paul
n. d. *Epics, Myths and Legends of India* (5th ed. rev., Bombay: D. B. Taraporevala and Sons).

Thompson, J. Eric S.
1950 *Maya Hieroglyphic Writing: Introduction* (Publication 589, Carnegie Institution of Washington).

Tregear, Edward
1891 *The Maori Comparative Dictionary* (Wellington, N. Z.: Lyon and Blair).

VILLACORTA, C., J. ANTONIO, AND CARLOS A. VILLACORTA
1930 *Codices Mayas (Codice de Madrid)* (Guatemala: Tipografia Nacional, pp. 225-448).

VOGEL, J. PH.
1932 *Le Makara dans la Sculpture de l'Inde* (Revue des Arts Asiatiques, vol. 6, no. 3, pp. 133-147).

WEINSTOCK, STEFAN
1950 *Lunar Mansions and Early Calendars* (Journal of Hellenic Studies, vol. 69, pp. 48-69).

WHITNEY, WILLIAM D.
1893 *Oriental and Linguistic Studies, Second Series* (New York: Charles Scribner's Sons).

WOLFF, WERNER
1938 *Dechiffrement de l'ecriture Maya et traduction des codices* (Paris: Librairie orientaliste Paul Geuthner).

LUBBOCK, TEXAS

MUSICAL CARTOGRAPHY AND THE DISTRIBUTION OF MUSIC

BRUNO NETTL

DURING the last two years, several publications have mentioned the desirability of mapping the distribution of music in the world. Paul Collaer[1] indicates that mapping the distribution of individual traits or features of music would yield historical insight in several ways. In another paper,[2] Collaer states that cartography must precede what he calls stratigraphy, the identification of historical layers. Fritz Bose[3] goes so far as to postulate specific steps in making distributional studies and setting their results down on maps. He suggests (1) making individual maps of single elements of music and musical instruments; (2) mapping the use and function of each instrument and element of music; (3) preparing comparative maps; (4) making maps comparing musical features with other aspects of culture and language. Bose's scheme is obviously predicated on work primarily based on instruments and does not go far toward solving the problems inherent in the preparation of maps for music *per se*. He is desirous, evidently, of using those aspects of music which correspond most closely in their nature to those elements of culture already treated cartographically, that is, instruments. The problems investigated in the paper at hand are primarily those, however, which do not have analogous features in other fields of culture frequently subjected to cartography.

Nettl[4] discusses the nature of musical areas in the world, and of their existence, possibly, as integral and independently developing units. Certainly statements of distribution in music, that is, statements which indicate the geographic location of musical phenomena, have been made in hundreds of publications. In the field of musical instruments, maps have been made by many students, especially Sachs,[5] Roberts,[6] and Izikowitz.[7] Maps of musical styles have been less common, but do

1 Paul Collaer, *Cartography and Ethnomusicology* (Ethnomusicology, vol. 2, pp. 66-68, 1958).

2 Paul Collaer, in International Musicological Society, *Bericht über den siebenten internationalen musikwissenschaftlichen Kongress Köln, 1958* (Kassel: Bärenreiter, 1959), pp. 334-336.

3 Fritz Bose, in International Musicological Society, *Bericht über den siebenten internationalen musikwissenschaftlichen Kongress Köln, 1958* (Kassel: Bärenreiter, 1959), p. 337.

4 Bruno Nettl, *Notes on Musical Areas* (Acta Musicologica, vol. 30, pp. 170-177, 1958).

5 Curt Sachs, *Geist und Werden der Musikinstrumente* (Berlin: J. Bard, 1929).

6 Helen H. Roberts, *Musical Areas in Aboriginal North America* (Yale University Publications in Anthropology, no. 12, 1936).

7 Karl Gustav Izikowitz, *Musical and Other Sound Instruments of the South American Indians* (Göteborgs Kungl. Vetenskaps- och Vitterhets-Samhälles Handlingar, Femte Följden, ser. A, vol. 5, no. 1, 1935).

appear in some publications.[8] However, the over-all problem of the distribution of musical phenomena in the world has not been laid out in theoretical terms. The purpose of this paper is to outline the kinds of things in music which can be studied in terms of their distribution, and to indicate some of the kinds of musical distribution which can be found in the world's cultures.

Studying the geographic distribution of musical phenomena is, generally, a more complex matter than the typical distributional study in cultural anthropology. Anthropological statements of distribution have usually (but not always) restricted themselves to saying that a given trait is present—or absent—in the culture discussed. To ask whether music is present or not in the world's cultures would not yield a variety of answers, since cultures without music of some sort (using the broadest definition possible) are unknown. What we want to know is what kind of music is found in the various parts of the world, and how the peoples are related musically. Ethnological studies of distribution, with their breakdown of traits into units which are or are not present in a given place, are most easily approximated by musical instrument studies. Thus, one could state that the banjo is found in a certain group of cultures, nations, tribes, and other kinds of units, and not found in the rest of the world. Taking the places in which the banjo exists, one could map the distribution of the number of strings, the material from which the instrument is made, and so on. Such a study would tell us a good deal about the qualities of the banjo around the world. But a similar sort of study for musical style would be less productive, mainly because music itself cannot be broken down into easily circumscribed components. The problem of mapping musical distribution is primarily one of identifying relationships among forms which are not identical or similar, and of rejecting as unrelated others which may seem, on the surface, to be related. For example, one might wish to decide which of various similar tunes are actually variants of one basic type. Or, one could try to find out whether two slightly different pentatonic scales are really sub-types of one form.

There is, moreover, the problem of deciding on geographic units to be used as a basis for stating distribution. Should we use units determined by political affiliation, by language, or by physical geography? (Fortunately, these would sometimes coincide.) Should smaller units, such as villages, be taken into consideration? Or perhaps families, which are often the units of musical distribution which can most realistically be studied? And let us not forget that, as in speech, each individual has his own musical peculiarities and should perhaps be considered as the

8 Bruno Nettl, *North American Indian Musical Styles* (Memoir, American Folklore Society, vol. 45, 1954); A. M. Jones, *Studies in African Music* (London: Oxford University Press, 1959), vol. 1.

basic unit of musical style. But at that point, the problem becomes academic. World-wide distribution of musical phenomena could only be plotted by reference to a combination of linguistic and political units, using the present state of knowledge about the world's music. On the basis of these, let us proceed to a presentation, in outline form, of the alternative approaches to distributional studies in music:

1. *Approach by element of music,* such as type of scale, kind of rhythm, polyphony, etc.

a. *General.* This would include, for example, a statement on the distribution of pentatonic scales in general, or of general (non-specific) types of pentatonic scales such as the scales without half-tones, or of rhythmic aspects of music such as heterometric structure, or the isorhythmic stanza, or of broad types of polyphony such as imitation.

b. *Special.* Here would come statements of the distribution of specific rhythmic patterns, or of melodic types such as the well-known "terrace" type of melody used by the Plains Indians. There is, of course, a large area of overlap among these "general" and "special" elements of music. The special elements would seem to be much harder to handle than the general, being harder to define or identify.

A set of maps giving the distribution of these elements of music would yield, by itself, a sort of picture of the world of music (at a given point in time). It would be, in some ways, misleading because it would ignore relationships which exist at other levels of distribution, to be discussed below.

A refinement of the technique of plotting musical elements by themselves is the quantification of material. This is an approach which has hardly been used as yet—and which, in the present state of knowledge of the world's music, cannot be considered all too reliable. Nevertheless, it deserves mention because of its potential importance.

In saying that the mere presence or absence of music would make no good basis for study because music exists in every culture, we neglected to point out the quantitative aspects of musical culture. Immediately, we would find differences in the amount of music in existence, considering quantity from several points of view. The number of compositions in a repertory, the amount of time spent in musical activity, the amount of music known to an individual (including the pieces or songs he recognizes, and the number he can perform) could be studied and mapped for comparative purposes. The counting of compositions would itself be problematic because of the difficulty, in some cultures, of identifying a composi-

tional unit and distinguishing it from its own variants. Finally, the number of styles or distinguishable bodies of music in a repertory could be counted. In some cultures—especially the simplest ones—there is only one such style, while other primitive repertories (such as that of the Shawnee) have several distinct styles. High cultures of Europe and the Far East may have many more, depending on the time of origin of each composition, the instruments in their variety, the function of the music (a church music style, a dance music style, etc.), and the segment of the population using it (popular vs. "classical" music). A comparative study of the numbers of styles in cultural units would yield interesting results, but it would be hindered by the problem of defining such a "style."

Besides counting compositions or styles, quantification of musical data in a technical sense could play a major role in distributional studies of individual elements of music, beyond indicating simple presence or absence. There are few elements of music (in the sense of the word used here) which are not found practically everywhere. When Collaer[9] indicates the desirability of mapping the distribution of the anhemitonic pentatonic scale, he must mean some sort of quantitative approach, for some compositions using such a scale are found in practically every culture. Most useful for various sorts of studies utilizing distribution would be an indication of the strength of this scale in each repertory: Is it used in every song, or in the vast majority (as in Cheremis songs), in half of the songs (as in some Plains tribes) or only occasionally (as, perhaps, in 19th century Western European cultivated music)? Of course, such statements would have to be based on large samples of material from each repertory, samples which are really representative, for many cultures are represented in the ethnomusicological literature by large, exhaustive collections from single ceremonies which might still not give accurate pictures of their entire musical cultures.

Since studies of the percentage of compositions in a repertory which contain a given trait are not common, an example of such a study is briefly presented here. It is, unfortunately, based on small samples of varying reliability, and should be viewed as a sample of method rather than as a statement of musicological fact. It concerns the phenomenon in North American Indian music known as the "rise," identified and so designated by George Herzog.[10] In a song with a nonstrophic structure, a short section is repeated at least twice, then followed by another bit of music at a slightly higher average pitch, which is, in turn, followed by the lower part. This alternation can continue for an unspecified period of

9 Collaer, *Cartography and Ethnomusicology*, p. 67.

10 George Herzog, *The Yuman Musical Style* (Journal of American Folklore, vol. 41, pp. 183-231, 1928).

time, but the lower section tends to appear more than once at a time, while the higher or "rise" section is sung only once each time it appears.

The rise occurs in the music of a fairly large number of tribes along both coasts of the United States. The accompanying map[11] indicates that it is strongest (occurring in over 50 percent of the songs) among the Yuman tribes of the Southwest, and among the Miwok, Pomo, Maidu, and Patwin of central California. In the repertories of the Northwest Coast Tsimshian and the Southeastern Choctaw, it occurs in 20-30 percent of the songs; among the Northeastern Penobscot and the Northwestern Nootka, it occurs in 10-20 percent of the songs, and in the songs of the Kwakiutl as well as the Southeastern Creek, Yuchi, and Tutelo, in less than 10 percent. Considering that most of the other tribes of the coasts are musically not well known, it is evident (provided the samples are reliable) that the rise has a center of distribution in the southwestern United States, and a thinning-out strength across the southern part of the United States and up both coasts. This information could be interpreted in many ways, but it is more valuable than a simple statement that these tribes have the "rise" in their repertories.

Some work along similar lines in North American Indian music has been done by Frances Densmore.[12] Unfortunately, her comparative tables usually include the tribe or tribes which the study at hand contains against figures representing the entire group of tribes whose music she had previously analyzed. Nevertheless, it would be possible to make cartographic representations of her figures which would, then, indicate the distribution, in quantitative terms, of certain special and general elements of music.

A. M. Jones[13] has made a map of types of harmony in Negro Africa, using as a basis the main interval between the voices (unison, thirds, fourths-fifths). No indication is given on the map of the amount of such harmonic music in each repertory, and of overlapping distributions (if any).

Rather opposed to the approaches outlined in the last three paragraphs is that of Marius Schneider[14] who believes that certain types of music are inevitably linked to certain types of economy, such as hunting, sheep herding, and farming. If a hunting culture has in its repertory music which is of a different type,

11 The map is based on Harold E. Driver and others, *Indian Tribes of North America* (Indiana University Publications in Anthropology and Linguistics, Memoir 9, 1953). The information on it is documented in the author's dissertation, *American Indian Music North of Mexico* (Indiana University, 1953).

12 For example Frances Densmore, *Pawnee Music* (Bulletin 93, Bureau of American Ethnology, 1929).

13 Jones, *Studies in African Music*, Vol. 1.

14 Marius Schneider, "Primitive Music" (in Egon Wellesz, *Ancient and Oriental Music*, London: Oxford University Press, 1957 [*New Oxford History of Music*, vol. 1]), pp. 13-14.

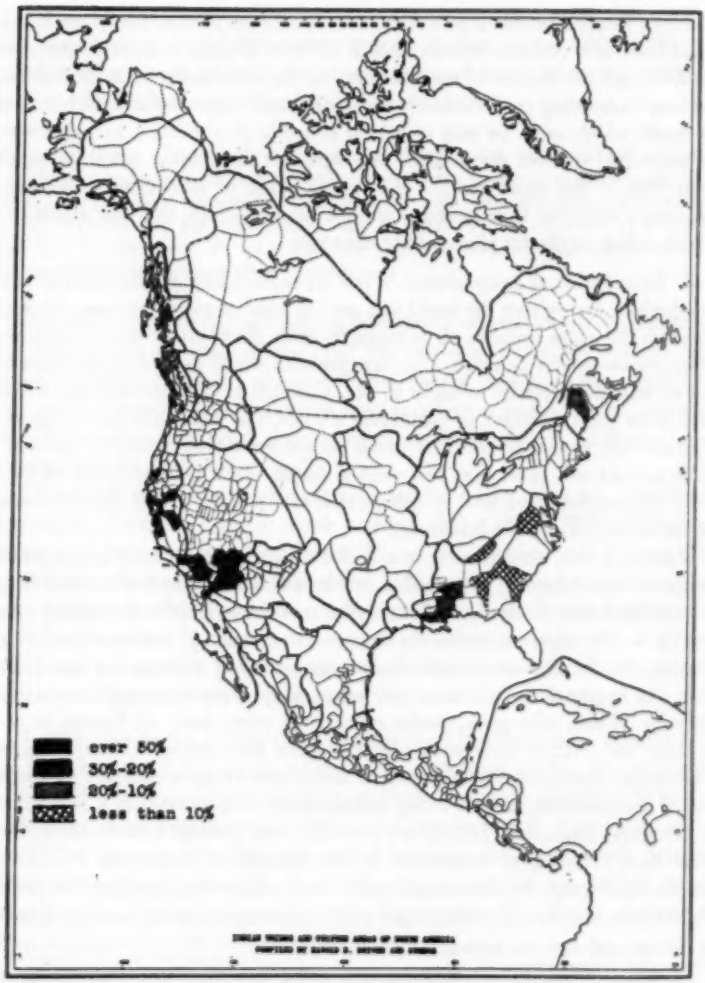


FIG. 1. Distribution of the "rise."

Schneider would consider it non-authentic. The merits of this theory are not discussed here. It is evident, however, that if we were to make a musical map of the world—based on elements of music or even on the distribution of individual compositions—according to Schneider's view, we would have to distinguish between the music which could be said to belong properly to a culture, and that which has infiltrated it from the outside, and base our distribution somehow on this distinction. If one could identify the "pure" music of each culture, one would presumably find that each repertory is rather homogeneous, and that quantitative considerations might not play an important role.

2. *Distribution of compositions.* While we could follow certain kinds of scales and rhythms throughout the world and get one kind of picture or map, we might approach the entire problem of cartography from the point of view of individual compositions—pieces or songs. Our first problem would be to find out what this unit of musical creativity actually is; for, although in Western cultivated music there is no great difficulty in identifying a piece, this is already more difficult in Western folk music. In primitive music we are sometimes baffled by the way in which natives will insist that two musical forms which seem identical to us are really independent, and how, in other cases, two seemingly very dissimilar songs will be called alike by the informant.

Assuming that we can come to a decision on what constitutes a composition, we must then identify (1) similar forms which are genetically related, and (2) similar forms which are similar only because the style (the elements of music, that is) in their repertory makes the independent creation of similar forms likely.[15] Plotting the distribution of individual songs and their variants has hardly been done. An approach (in which genetic relationship is not necessarily assumed) is made by Wiora, who gives similar tunes from many parts of Europe in order to show the stylistic homogeneity of European folk music.[16] Here it becomes evident that distribution of elements of music may be quite contrary to distribution of compositions, at least within certain limits. The variants of a tune as sung in Hungary, Spain, and Ireland are very different, perhaps because the styles of these three cultures, as determined by the elements of music, are so different. On the other hand, the three styles are relatively alike when compared to African and Chinese music, and, perhaps as a result, the composition in question is limited to Europe and does not appear in Africa or China.

15 Walter Wiora, *Europäische Volksgesang* (Köln: Arno Volk, 1953 [*Das Musikwerk*]); *Europäische Volksmusik und abendländische Tonkunst* (Kassel: Hinnenthal, 1957) are examples of this approach.

16 Wiora, *Europäische Volksgesang*, pp. 50-53.

Again, Marius Schneider[17] offers an interesting sidelight, saying that a melodic type (i.e. a group of melodies similar enough so that genetic relationship could be inferred, or a type of music the various forms of which have some inner relationship which cannot always be identified by analysis)

> is revealed above all in performance and in the peculiar way in which metre and melodic line coalesce in the rhythm. On paper it can be grasped only incompletely, but the ear detects it immediately. The same melodic idea, appearing simultaneously in the music of two different peoples, can be used by each of them in a different type. On the other hand, the same type may appear in two different melodies although the actual notes may have little in common.

We must, then, distinguish among three kinds of phenomena when considering distribution of compositions: (1) the variants—definitely established as such—of a single piece; (2) similar melodies without definite genetic relationship, such as the "wandering melodies" of long standing as musicological curiosities; and (3) melodic types, which seem to approach the specialized elements of music mentioned above, such as the "rise."

The distribution of compositions in primitive cultures has not been studied thoroughly. Only one example comes to mind, the study by Willard Rhodes of the opening Peyote song among several Plains and Southwestern United States tribes.[18] But detailed investigation of this kind would presumably show whether songs coincide in their distributions and form "areas," or whether each song has an area of its own. Quantification of such data would involve the number of variants of a song in a given culture or sub-culture, the number of individuals knowing the song, and the amount of use which the song undergoes.

3. *The distribution of musical styles,* or the identification of musical areas, has been attempted by various scholars: some of these studies are summarized by Nettl.[19] They range from attempts to divide the world into three large areas to divisions of continents into "musical areas" approximating ethnological culture areas. The question whether such musical areas, or the styles which determine them, have a life of their own, as it were, that is, whether they remain integral units because of the interdependence (in the music itself) of their stylistic features, is discussed in the above-mentioned study.

17 Schneider, "Primitive Music," p. 24.

18 Willard Rhodes, *A Study of Musical Diffusion Based on the Wandering of the Opening Peyote Song* (Journal of the International Folk Music Council, vol. 10, pp. 42-49, 1958).

19 Nettl, *Notes on Musical Areas.*

A more scientific attempt at defining the style of a culture is made by Freeman and Merriam.[20] Here the methods of mathematical statistics are used to identify the essential and predominant elements in a body of music. "If music can be classified into various types, and distinction made among these types by statistical methods, several problems in comparative musicology can be attacked with considerably greater precision than has heretofore been possible." The essence of this approach, from the point of view of distributional studies, is the possibility of reducing the traits and aspects of a body of music to a single formula which would then be compared to similar formulae for other bodies of music. Thus, it would be possible, by these methods, to use statistical methods to arrive at statements of the degree of relationship among various bodies of music. The reliability of the samples could also be evaluated by statistical methods.

Distribution studies at the musical area level could be made in two ways, at least. First, the concept of a musical area could be used, and groups of tribes or cultures having similar styles and possibly sharing distribution of compositions could be identified. This is essentially what was done in some studies of North American Indian music.[21] Here attempts were made to find the main or predominant kind of music of each tribe, and the area based on these. The Plains Indians were considered a single area on the basis of the style containing terrace-shaped melodies, large intervals, pulsating and tense vocal rendition. The fact that some of these tribes also had other musical styles (in smaller quantity), such as the Peyote styles (described by McAllester[22]) and the style of the Ghost Dance songs (described by Herzog[23]) was disregarded. The principle of Marius Schneider, mentioned above, that each people has an "authentic" or "pure" style which is basic to it, was, in effect—though for reasons other than Schneider's—followed in these studies. In relatively simple music such as that of the Indians, it is not too difficult to identify a predominant style. In other cultures, such as East African where both Negro and Arabic elements are strong, or in a high culture with social stratification of music, it might be much more difficult to define a single style which is the most important.

20 Linton C. Freeman and Alan P. Merriam, *Statistical Classification in Anthropology: an Application to Ethnomusicology* (American Anthropologist, vol. 58, pp. 464-472, 1956), p. 466.

21 Roberts, *Musical Areas in Aboriginal North America;* Nettl, *North American Musical Styles;* George Herzog, *Musical Styles in North America* (Proceedings of the 23rd International Congress of Americanists, pp. 455-458, New York, 1930).

22 David P. McAllester, *Peyote Music* (Viking Fund Publications in Anthropology, no. 13, 1949).

23 George Herzog, *Plains Ghost Dance and Great Basin Music* (American Anthropologist, vol. 37, pp. 403-419, 1935).

Musical areas in continents other than North America have not been constructed in great detail. Several attempts have been made to divide Africa, the most recent and satisfactory being the division into areas coinciding roughly with culture areas by Merriam.[24] In this scheme, the distribution of instruments and musical style is combined, but no detailed documentation is given.

Setting aside the "musical area" approach, it would be possible also to plot the distribution of the stylistic types—such as the Peyote song style, the Ghost Dance style, the peculiar style of singing epic songs in the Balkans, etc., which are, in some cases, present together with other styles, superimposed on each other in a repertory. There are some cultures which have several different musical styles which they accommodate more or less equally, and this in itself is a matter worth cartographic investigation. The fact that a kind of combination of musical elements can develop such homogeneity as to spread, as a unit, from culture to culture, without necessarily bringing with it the individual compositions, is somewhat analogous to the picture of compositions spreading across stylistic lines. In other words, a composition can move—and change its style— to an area with a different style; and a style can move—assuming that new compositions are created with it as a basis—across the lines of distribution of individual compositions.

The possibilities of distributional studies mentioned here indicate that the music of the world is a complex matter—something no one has doubted. The beginnings of musical cartography could proceed along any of the lines mentioned (and along others not included, such as the function and use of music, the distribution of instruments, etc.), but it would hardly be complete if all of the components of musical distribution discussed here were not included.

Wayne State University
Detroit, Michigan

24 Alan P. Merriam, "African Music" (in Bascom and Herskovits, *Continuity and Change in African Cultures*, pp. 76-80, Chicago: University of Chicago Press, 1958).

THE KĀNYA-KUBJA BRAHMINS AND THEIR CASTE ORGANIZATION*

R. S. KHARE

THE WORD "BRAHMIN" did not have the same implications in the Rig-Veda as it does today. Its meaning became, with the passage of time, more and more complex. In the Rig-Veda, it did not stand for a caste[1] but "for a group of people who sang hymns of praise to various gods." By the time of Brāhmaṇās, Brahmins were recognized as gods.[2] Since then incentives for fission and ritual elaboration have multiplied and varied in their intensity under different temporal settings. Endlessly reinforced threads of endogamy, the bulwark of caste,[3] and restrictions in taking food and social interaction and the tacit recognition of caste by birth, provided a very tough and sustaining social fabric to Hindu society. Endogamy, like the caste system itself, is also dynamic and marked by the stages of rigidity and mobility in its application through time. In the Rig-Vedic period it is latent, emergent and formulating in post-Vedic time, and "rather a universal custom than a rigid rule of caste" in the Jatakas. "But once evolved, endogamy either with or without hypergamy has certainly sustained itself without a break."[4] The concept of "blood purity" has ever remained the dominant cultural interest, for and around which the complex corpus of whole of the social living oriented itself. The elaborate rights and rituals pivoted around it and grew symbiotically.

* Submitted to the First Convention of Social Anthropologists in India, held March 11, 1960 at the University of Lucknow. The sentences within quotation marks, not otherwise specified, are the remarks of informants reported from interview notes.

The author is grateful to the Principal and Vice-Principal of Kanya-Kubja College, the Associated College of the University of Lucknow, who themselves helped him in getting information about this caste and appreciated objectively the need for such a study in a scientific way. He is also grateful to about a dozen teachers and colleagues at Lucknow University, as well as at Kanya-Kubja College, for their coöperation in the matter. He thanks them all. He is particularly indebted to Professors B. L. Shukla, K. D. Shukla, and M. P. Shukla for help in collecting and verifying the information.

The author is greatly indebted to the late D. N. Majumdar, Professor and Head of the Department of Anthropology, Lucknow University, Dr Harold Gould of the University of Kansas, and Assistant Professors K. S. Mathur, Dr T. N. Madan, and Gopala Sarana of the Anthropology Department, Lucknow University, for their constructive suggestions and improvements of the paper.

In spite of the author's care, if any remark evokes any adverse feeling from the people under consideration, the author has only to offer his apology with the plea that his aim has been to study an extremely intricate community, a systematic account of whose social organization had never been attempted before.

1 Shastri, 1954, pp. 25-26.

2 Satapatha Brahmana VIII, 3.11, quoted from Shastri.

3 Griswold, 1931, p. 678.

4 Ghurye, 1957.

The outstanding fact was that the Brahmin always stood secure at the apex, at the helm of the organizational forces, and is therefore aptly called "the corner stone of the whole organisation."[5]

This paper is a study of the Kānya-Kubja Brahmins of northern India. The main features of their caste organization will be described. Throughout this paper, I shall consider the Kannaujias more as a caste than as a sub-caste. The basic reason for such an assumption is that they still emphasize their rank, status, and occupation, mode of life and customs, prescribed rites and rituals, and hold these as peculiar to themselves.[6] Even among themselves their ways of performing rites and rituals divide them into groups. This ritual-mindedness is present even today, particularly among those members of the group who practice priestcraft, have humble means of subsistence, and mostly reside in rural areas. The two most important bases of caste structure, viz. endogamy and restrictions on feeding, however, form my main perspective in looking at the organization of this caste.

I

Kannauj as a city was once of great historical importance. It remained the capital of the Tomars down to the invasion of Mahmud in 1021 AD, which occurred immediately after the defeat and death of Rājā Jayapāl, ruler of the Panjab. Once again during the regime of Jaya Chand, the last of the Gahādavalā kings, Kannauj became the "rival of Delhi both in extent and magnificence." In 1193, after the fall of Delhi, Muhammad Ghori marched against Kannauj, and with the defeat of Jai Chand there ended the wealth and the importance of this city. Afterwards it remained under the influence of Mohammedans. Risley and Crooke both emphasize the importance of Kannauj since many sub-castes take their names from this place.[7] Sir M. Monier Williams in his *Sanskrit-English Dictionary*[8] describes it as an ancient city of great note in the northwestern provinces of India, situated on the Kāli Nadi, a branch of the Gangā. He reports that its name presents "perhaps greater variations than that of any other place in India." "In antiquity," he says, "it is next to Ayodhya in Oudh and the ruins of the ancient city are said to occupy a site larger than that of London." Interestingly enough, a veteran Indian author and journalist (and my informant) Pandit

5 Prabhu, 1954, pp. 154-158 *passim*.

6 This group of Brahmins differentiates the collateral social groups within itself in the following way. There are two groups of Brahmins, Sām-Vediya and Yajur-Vediya. These two have different patterns of ritual duties. Sām-Vediya have Gandharva as "Up Veda," Kauthumi as Shākha and Gomil as Sutra, while Yajur-Vediya have Dhnurved as "Up Veda," Madhya Nandniya as Shākhā and Kātyāyan as Sutra. The former group has Vishnu as its *devtā* (god) and the latter has Shanker or Siva.

7 Risley, 1891, 1915, p. 306; Crooke, 1896.

8 Williams, 1899.

Ambika Prasad Bajpai[9] remarks that "probably up to 900 A.D. the land of Kanya-Kubja was popular by the name of "Mahodaya'." Next, he mentions the case of Bhupā or Bhupati Dikshit (based on many ancient Vanshavalis genealogies) living during the time of King Parimal in the thirteenth century AD around Mahobā in Bundelkhand, Hamirpur district. But the description given by the author lacks sound historical proof. It is probably a conjectural reconstruction of history which attempts to validate his own *gotra*.

One thing is certain: Kannauj had been a great and rich seat of imperialism before the invasion of Sultan Mahmud (1018 AD). "Few of the ancient Hindu states have attracted more notice than Kānya-Kubja or Kannauj. It is one of the most ancient places in India: it gives rise, and gives a name, to one of the great divisions of the Brahmin class; its capital was, perhaps, the wealthiest visited by the first Mohometan invaders; and its wars with the neighbouring state of Delhi contributed to accelerate the ruination of Hindu independence."[10]

Most of the informants say, as does Crooke, that the name of their caste has sprung up from the name of the city of Kannauj and point out that such a name is a *sthānparak* (denoting place). Only traditions and legends, myths, and sayings speak regarding the origin of this caste. The legends referred to in the following paragraph are mentioned by Prasad as well as Monier Williams.

These Brahmins originated from the hundred beautiful daughters of Kusínābh who is identified as the grandson of Brahmā (the Creator) and the king of Kannauj city. These daughters, due to "Vāyu Prakop" (the curse of the god of Vāyu, "Air") for non-compliance with his licentious desire, became ugly and hunch-backed and later on were given as a gift *(dān)* to a Brahmin named Brahmadatta. The girls, through the Brahmanical power of the ascetic conveyed through a touch, became fair maidens and lost their curse-begotten crookedness. After this miracle his residential place was named as Kānya Kubja (etymologically meaning Kanyā–girl; Kubja–hunch: hunched or crooked girls). "A land which is served by Brahma-rishis is called Kannauj and all of the Brahmins residing in that area were called Kanya Kubja."[11]

Another story regarding the origin of Kānya-Kubja Brahmins runs as follows:[12]

Rāma, after killing Rāvana and coming back to Ayodhyā, the capital city, performed a great *yajña* (sacrifice). A large number of priests assembled there. The

9 Bajpai, 1946. This is mentioned in Kanya-Kubja Vanshavali as well as by informants reporting to have got it from their forefathers.

10 Elphinstone, 1916, pp. 231-234.

11 *Vide* Valmiki Ramayana Sarga, 32 and 33, 1st Canto, Balkanda.

12 Prasad, 1959.

gathering also included two Brahmin brothers, named Kānya and Kubja. One of them (it is controversial which one, but according to Prasad's Vanshavali, it is Kānya, the elder brother) took *dān* and *dakshiṇā* from King Rāma while the other did not accept it, for he thought that Rama was performing this great *yajna* in order to absolve himself of the sin of killing so many people in the battle fought against Rāvana.[13]

Some people even claim that there were no brothers Kānya and Kubja, while the writer of the Vanshavali accepts their existence and considers it "immaterial" to discuss (for status) who took the gifts and who did not, because the gifts made by Rama, the God Himself incarnate, were rare and good for every one. Kanya with his followers remained south of the River Sarju. This group was called Kanya-Kubja Brahmin and the other which remained on the northern side of the river, such as Gorakhpur, Mirzāpur, Ayodhyā, Prayāg (Allahabad), Jaunpur, Basti, Āzamgarh and Kāshi (Vāraṇasi) was called Saryupāriṇ Brahmin.

II

To trace the distribution of a caste with a long time coördinate is very difficult, especially for a country which lacks authentic records of the social history of its people. However, one thing is definite: the land of these Brahmins to which they owe their name and allegiance was neither devoid of past power and grandeur nor free from political turmoil and subjugation down to British times. Once falling into the Mohammedan grip it was never relinquished as long as they ruled. The culture and religious practices of the two communities—Hindus and Muslims —were so different that, as noted by Al-Biruni, "the Hindus and Muslims looked upon each other as contemporaries and natural enemies." A violent reaction might therefore be expected by this highest ranking caste "when a death struggle (battle) was being fought by the valiant sons of Ind for self-preservation of cultural entity."[14] During and after British rule many factors, such as better communications and changed socio-economic emphasis, probably accentuated the dispersal of these people. But those who were illiterate or just literate remained mostly within Uttar Pradesh. Only a few highly educated with specific purposes moved to other parts of the country. The long Mohammedan rule of northern India must have been a time of perpetual crises for the Hindus in general and the Brahmins in particular. It was a potent factor which led Brahmins to lay emphasis on the recognition and importance of territory, the *susthān*, the original place of concentration

13 The implication of such a denial is that through a gift *(dān)* the priest has to take on himself all the sins committed by Yajman and has to absolve himself of the charge through his penance and *brahma-shakti* (Brahminical power).

14 Ghurye, 1957, pp. 110-111.

—the safety of ritual purity was inversely related to distance from the original place of concentration.[15]

It was largely the migration which led to the recognition of the ten divisions of Brahmins according to their geographical position. As reported by Pandit Ambika Prasad Bājpai,[16] it was effected probably in the time of Sankarāchārya, a powerful philosopher emerging after the hey-day of Buddhism and Jainism. Due to this spread people of one *gotra* are found in different parts of the country. For example, the Upmanyu *gotra* is present not only among Kanya-Kubjas but also among the Brahmins in Bengal, Orissa etc. The Kanya-Kubjas themselves have, from a very early period, migrated and settled in various parts of the country, such as Kanya-Kubja of Berār, Maliyāra of Bengal and God-bêta of Mednipur district. These Kanya-Kubjas settled there, as is reported, about three centuries ago and are, in the last case, "able to tell their complete genealogy right up to the name of the Brahmin who migrated from a particular place in the Kanya-Kubja basin." This particular migration is different from that of five Kanya-Kubjas named Bhatta Nāraiṇ, Daksh, Sriharsh, Chandad, and Vedgarbh who migrated to Bengal at the time of King Ādisur. Migrant Kanya-Kubja Brahmins gradually moved away from the customs and practices of people in the original basin. Furthermore, there is no evidence of any social "connection" with them. They cannot and "should not" get daughters from the inner, the main locus of concentrations, according to Sripati Misra.

Accordingly, we find today an original locus of concentration for various *aspads* of Kanya-Kubja Brahmins. For example, a few famous geographical concentrations include such groups as Bajpais of Lucknow, Misrās of Mirasarai, Tewārís of Madarpur and Jahāngirābād, Dixits of Batpur, and Shuklas of Hafizabad and Shakurabad. These centers of concentration also give an idea of their rank in the *biswa* scale and are an important factor for marriages as noted above.

Quite recently, "after continuous efforts for a score of years," a learned Brahmin named Sripat Misra, the Editor of the periodical "Kanya-Kubja" and sometime General Secretary of a similarly named Society, published the distribution pattern of Kanya-Kubja Brahmins throughout India.[17] The data were collected by visiting different places of concentration of this caste within Uttar Pradesh and outside it, and taking genealogies of (socio-economically) prominent and "ac-

15 Another example, that of the Bajpais of Lucknow, shows that the migration was not favored: the Ānk ancestors of the Bajpais of Lucknow who migrated (even thirty or forty miles) from the original place of concentration were degraded to a low *biswā* (degree of status) in comparison with those who remained at *susthan*.

16 Bajpai, 1946, Chap. IV.

17 Misra, 1959.

quainted" families. He postulates three concentric zonal circles for the Kanya-Kubja Brahmins in India "with diminishing blood-purity as we move towards the outer circle." Here my concern is not the "purity" and "impurity" as represented by these circles, but I take it as a rough way of showing spatial distribution as long as no better data are available. The first circle with the center at Kannauj, encompasses districts such as Lucknow, Kanpur, Unnao, Rae Bareli, Fatehpur, Hardoi, and some parts of Sitapur while the next larger concentric circle embraces districts like Allahabad, Etawah, Agra, Gonda, Bahraich, Bareilly, Mirzapur, Delhi, Shahjehanpur, some parts of Lakhimpur-Kheri, and Banda, and some northern districts of Madhya Pradesh. Roughly the composite area of these two circular zones lies between 23° to 28° latitude and 80° to 83° longitude. It lies west and south of river Ghāgrā and is limited in the west mainly by the Jamuna. Beside these main concentrations, the third zone is rough and inaccurate. It is characterized by concentrations limited to certain cities and other quite small pockets scattered all over India, such as Indore, Bhopal, Bombay, Calcutta, Patna, and Muzaffarpur. Other places in India also have these Brahmins but in insignificant numbers. The author of this scheme has quite recently declared in most emphatic terms his belief that the inner zone is the "purest" and that its purities must be preserved by refusing to marry girls outside it.

III

In this section I shall deal with various elements of caste organization found at present. Kanya-Kubjas were described by Crooke as having a "tribal organisation which is very intricate."[18] The main lines of organization among these Brahmins are *gotra, pravara, aspad, susthan, ank* and/or *purusha,* and *biswa.* Let us study them one by one in some detail.

Gotra

The sociological sense of the term *gotra* can be traced from its use in the Vedas where it stood for a "cow stall." "Brahmin gotra in its origin denoted simply a group of family members who enjoyed rights in a particular pasturage."[19] Some have said that the word literally means "a collection of cows" (derived from the word *go-* "cow"). The Kanya-Kubja informants explained that in ancient times Rishis used to keep herds of cows because they needed *sadyāgavaghrat* (daily churned fresh butter from cows' milk for the Agnihotra, sacrificial fire). The disciples of the various Rishis tended these herds and also learnt Vedas from their Gurū. Later on, different herds, under different Rishis and tended by differ-

18 Crooke, 1896, vol. 3, pp. 124-126.

19 Fick, 1913, pp. 354.

ent groups of disciples, bore the names of these Rishis and these names were used to indicate their groups. Prabhu states that "the Gotra of a family is said to be named after the Rishi-ancestor who founded the family in the immemorial past."[20] The *gotra* varied in usages which multiplied with time as the Rishis increased and attained fame. In ancient India, it has been pointed out, the *gotra* did not stand so much for blood relations as it did for the spiritual connection, inheritance, and a joint membership.[21] But that it was always remembered and kept in mind is also borne out by the prayers which required the pronunciation of ones *gotra* and *pravara* every morning, noon, and evening. Formerly, "the gotra limited and determined participation in various sacrifices" (although this notion is not accepted by all scholars of ancient India). "However, this ritual did not profoundly influence practical life as did the rules prohibiting marriage between members of the same gotra . . . These singular and vigorous ordinances likewise seem to have been a growth of later times."[22] In Rig-Veda and Satapatha Brāhmaṇa (1, 8, 3, 6) "marriages between members of the same family were of common occurrence" but by the time of the Grihya Sutras, marriage observing *gotra* exogamy was prevalent and in-marriage was prohibited by the time of the Dharma-Shastras. In 300 BC, according to H. Jacobi, marriages within one's *gotra* were prohibited. *Gotras* were not unknown to Buddhism and Jainism, even though they were endeavoring to systematically root out Brahminical traits. The use of the *gotra* and *pravara* for marriages among Brahmins, would seem, according to an informant, "to be largely a matter of local distinction." But P. Chentsal Rao (quoted by Fick) remarked that no case ever came up in the court involving this kind of dispute. People of certain *gotras* were reported to have the privilege of marrying within their *gotra*. They were the so-called *kévala* (separate) *gotras:* such were Bhargavas and Angirasas. *Gotras* are also reported to have changed in ancient times. Sometimes people had more than one *gotra* but later on the *gotra* system, as pointed out above, became rigid. It has been the only basis of grouping in the society for a long time.

Among the Kanya-Kubja Brahmins "there were as many *gotras* as the followers of Kānya but in old genealogies seventy-two *gotras* are mainly accounted for."[23] But at present there are only sixteen important *gotras* of which the first six are (1) Kashyap, (2) Upmanyu, (3) Katyayan, (4) Bharadwaj, (5) Shandilya, (6) Sankratya. These six *gotras* form six Houses (clans) or *Khutkul* and are rated as *Uttam* (superior) while the next ten—namely, Vashisht, Parasar, Kaundinya, Karishi, Kaushik, Bhardwaj, Dhananjaya, Gautam, Vats, and Garg—

20 Prabhu, 1954, p. 57.
21 Fick, 1913, p. 354.
22 *Ibid.*
23 N. P. Misra, 1959, p. 27.

are regarded as of middle rank *(Madhyam)*. The spelling of these *gotra* names differs from one author to another and there is lack of precision in earlier genealogies as well. Bajpai does not speak of more than the sixteen *gotras* enumerated above, while Pandit Narayan Prasad claims as many as seventy-two *gotras* though he has not given a list of all of them. Further, the Half House *(Adh-Ghara)*, according to Bajpai, results from the partial inclusion of the *gotra* of Kashyap in the *Khutkul* scheme, while according to Prasad, Half House is formed by "all the next ten gotras which are called *Madhyam.*" No *gotras* for *Dhākara*, the "lowest" and third category are given by Bajpai, while they are the following according to Prasad—Parāsar, Kāsyap, Bhāradwaj, Dhananjaya, Gautam, Vats, Garg, and Kaushik. Leaving these differences aside, one thing is definite: as revealed by the classification, some kind of hierarchy into *Uttam, Madhyam,* and *Dhākara* has remained for a long time and was thought largely to be based on adherence to various values of *kulinta*. According to Bhāgwat Purāṇa they are as follows: "Peaceful (or quiet) nature, self-restraint, austerity, purity, contentment, forgiveness, uprightness, knowledge, kindness, firmness, devotion to God, and truthfulness" (Bhag. VII, XI, 21). In a book named *Kuldipika* there is an enumeration of nine such characteristics for the Kulin Brahmins.

Some informants have reported that about 250 years ago there were only four Houses (clans) and that two more were added later on during the period of the Nawabs in Uttar Pradesh. This *Uttam, Madhyam,* and *Ghara* scheme is reported to have been the product of the *biswa* system (vide below). Later on it also brought about stringent restrictions on commensalism. The *biswa* scheme, as will be shown later, does not seem to go back more than four hundred years and the same applies to the *ghara* system. For remembering *Uttam gotras,* there is a nemonic formula, reported by informants as well as by Crooke,[24] namely, Kāk, Sās, Ubha, where Kā stands for those who belong to Kātyayana *gotra,* Ka for Kashyap, Sā for Sāndilya, S for Sankritya, U for Upmanya, and Bha for Bhardwaj. "These members of the six clans are regarded as the true Kannaujias," remarks Crooke, who has arranged various groups much in the same way as Prasad. The *Dhākara,* according to Crooke, is "low" because "they plough with their own hands and smoke." Crooke reports another kind of "Panchadari" who rank even below the *Dhākara*. They are called *"Bhulnihai ki Panchadari,"* who as he reports, have sprung from the *Khutkul*. Crooke arranges Kannaujia hierarchy as shown in Figure 1, with which is compared Prasad's scheme. Essentially, they are similar.

24 Crooke, 1896, pp. 125-126.

Pravara

Pravara is a differentiation little known to many informants interviewed, and is of lesser practical use at present in the settlement of marriages, etc. The *pravara* meant "the invocation of Agni (Fire) by the name of the rishi-ancestors of a Brahmin who consecrates the sacrificial fire."[25] *Pravara* names were used by

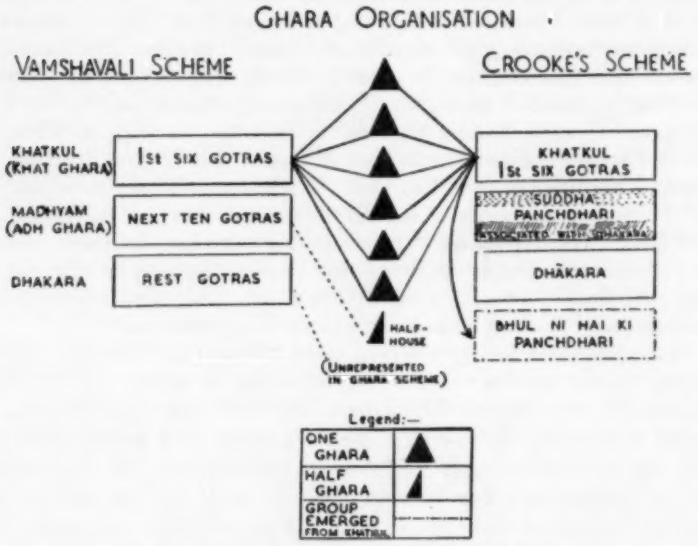


Fig. 1. Comparison of two schemes of social hierarchy.

the priest in the past to prove his bonafides to Havya-Vāhana, the deity who carries the libations to heaven, in order to perform the sacrifice fitly and worthily. "It was a law that the number of Arśeyās or Pravara-rishis, whose names were thus pronounced, might be one to five but no other" and in general, persons belonging to the same *gotra* or having the same *pravara,* even if having only one in common, were not allowed to intermarry.[26] Formerly, *pravara* names were repeated by a Brahmin three times a day at morning, noon, and evening prayers. However, only three or four of my informants reported that they observe the practice of repeating it once every morning at the present. Fewer still knew exactly

25 Fick, 1913.

26 Prabhu, 1954, p. 158; Fick, 1913, p. 357.

what it meant. It originally helped in the evolution and maintenance of the concept of *gotra* by facilitating an extension of the genealogical line. The general idea of it held by various informants was that names of those descendants of the "Gotra-Karin" Rishis who attained name, fame, and miraculous *brahmashakti* (Brahminical power) through their exemplary austerity *(tap)* in the great Yajnas and who, in short, complied more strictly with the Guṇa and Karma of the Brahmins were added after the *gotra* name of the Rishis.[27]

In order to give some idea of the relationship between *pravara* and *gotras*, I have reproduced below some *gotras* along with their *pravara* (based on Prasad's Vanshāvali):

Gotra	*Pravara*
1. Vasistha	1. Vasistha
2. Upmanyu	1. Upmanyu 2. Vasistha 3. Yajnavalkya
3. Kashyap	1. Kashyap 2. Naidhurra 3. Avatsar 4. Kaushik 5. Lohit

However, this collection of *gotra* and *pravara* is not free from controversy. We find a different scheme in the case of Bajpai's enumeration and he admits that there is a large amount of confusion regarding the names of the sons of various "Gotrakarin" (*gotra*-forming) Rishis.

Āspad–Title

According to Paṇini, *āspad* is attained by getting fame and ability *(Āspadam pratisthāyām)*.[28] In his genealogy Prasad quotes it to explain various surnames current at present, such as Pandey, Pathak, Tripathi, Dwivedi, Trivedi, Chaturvedi, Avasthi, Dikshit, and Shukla. Misra, according to an informant, means "being well accomplished in all Gunas and Karmas of Brahmins and always living united." The *aspad* can be understood as a title or *alla* which Kanya-Kubja Brahmins obtained by performing various big sacrifices such as Āvasthya, Somayāga and Vajpéya, or by becoming well versed in the Vedas and imparting knowledge to their pupils. The interpreation of Misra, as an *aspad*, differs from person to person. One is noted above while another says that those people who were accomplished in all the Vedas as well as the Tantra were called Misra. There is strong evidence that *aspads* changed as soon as any ancestor in the lineage got name and fame by performing a particular type of sacrifice or obtaining special

27 Bajpai, 1946, pp. 6-93; Panini Sutra, Chap. IV, Pad. 1.
28 Panini Sutra, Chap. IV, Pad. 1, Sutra 146.

adeptness in Sanskritic texts. Bajpai shows through his genealogy that his ancestors held the titles of Pāthak, Avasthi, Dixit, and Bajpai successively on account of different sacrifices that they performed. At the present time, the *aspad* as such no longer signifies anything except that it is a common surname suffixed as an easy naming device. It is very common in the genealogies. One *gotra* may have more than one *aspad,* and, conversely, one *aspad* may be found in different *gotras.* For matrimonial alliances, the one principle that is strictly adhered to is the avoidance of *gotra*-endogamy so that two families belonging to the same *aspada* may intermarry if their *gotras* are different, but even those belonging to different *aspadas* may not, if their *gotra* is the same.

Susthan or Suthaon (Original Place of Concentration)

This becomes a critically important factor whenever there is any suspicion about caste rank between two parties who are either initiating talks for marital relations or have to take *(kachcha* and/or *pakka)* food together. Emigration from the original place of concentration *(susthan)* is invariably looked upon as always having injurious effects on the original status. Migration also gives rise to the suspicion that the *kulinta* of those concerned is very easily lost by their becoming wealthy because the connotation is that the association of excessive wealth with a Brahmin warrants suspicion as to the means by which the Brahmin collected it. Ideally, however, any departure from the Brahmins' *Guna-Karma* led to the degradation of their status. Wealth is one such factor which tempts them from ancient attitudes. Examples abound; e.g. those who took Chakledāri from Mohammadan kings and nawabs and became thereby rich were ranked "low," those "who took *pān* (betel) from the hand of Emperor Akbar were considered to be low." Still another example from Crooke is that of Sital Prasad Trivedi, son of Thakur Persad, who was a bandit attached to the Nawab of Lucknow: on account of his deeds, he and his descendants fell to the *Bhulnihai ki Panchadari,* a new lowest group (as shown in the chart, Fig. 1).

When a family migrated from the original place of concentration *(susthan)* it was not remembered by those at the original place because, as an informant said, "people remember each other only by participating in various ceremonies *(samskāra)* which take place from time to time." Though the *biswa,* etc., of the migrated family may remain the same, for marriage connections it still needs corroboration from those who live nearby or in the *susthan* and have had commensal relations with the family for a long time. They have to prove their bonafides relating to *gotras, aspad, ank,* and *susthan* by telling the bridegroom's party, for example, that persons A, B, and C of the *susthan* know his family and can prove

the validity of the claims made for the status. Therefore there is a tendency to keep contact and mutual relations with those at the *susthan*. According to information provided by various informants a real relative is one who participates in birth, marriage, and death-ceremonies and undergoes the *Mura-Murwāwā* (head-shaving) ceremony in connection with the last.

There has recently been a tendency among those Brahmins lower in *biswa* and away from the original place of concentration to rise by marrying their daughters into the family of one higher in the above respects. Various means adopted for doing so consist of either giving away a tempting amount of money to the testifier (belonging to a higher group and living near a *susthan*) or of contriving to make groups of higher people eat with them (especially in the *bhāt*, the "rice-eating" ceremony after marriage). Other methods may sometimes amount to coercion also. But such "climbers" are regarded by those higher in status as *banuan* (artificially risen). These "climbers" claim higher *biswa, aspad*, etc., and thus get them established either by the above methods or by simply referring to themselves as the *vamshaj* of some highly respected family which admits them as their relatives and is itself connected with the *susthan*. Those lower in the *biswa* ladder always remain keen on establishing relations with those higher in the ladder at a distant place where their caste status may not normally be disclosed. With the passage of time they are allowed to interact socially with the people higher in the *biswa* scale. Wealth in the form of a good dowry accomplishes this easily and effectively. A section of the informants are reluctant to admit that the *biswa* can be changed in any case. It is only "social status" that rises because of "higher" marriage connections.

I have written something about migration while dealing with the distribution of Kanya-Kubjas. It seems that the formation of Uttam, Madhyam, and Ghara complexes was coupled with the wide migration of this caste in pursuit of various occupations ranging from priesthood and service in the army to rulership.[29] Unremitting repression under Mohammedan rule after Jai Chand catalyzed more and more the recognition of their ties with the place of concentration. The first impetus may have been given for the recognition of broad geographical areas among Brahmins, as remarked earlier, about the period of Sankaracharya, while that of the thirteenth century and later seems to be the second wave circumscribing and limiting the area, leading to more rigid and deep ritual and social implications. The association and rigid recognition of the territorial bonds with different *aspads* (some of which are enumerated above) seem to be the result of a reacting society placed under prolonged crises.

29 Sripat Misra, 1959; article "India," Encyclopaedia Britannica.

Ānk and Purusha (Ancestors)

Primarily the two, *ānk* and *purusha,* aim at showing the relative differences of the generations in the account of agnatic kin. *Ānk* stands mostly for the names of those ancestors who are of the comparatively recent past. A discussion of *ānk* naturally follows the account of *gotra* and *pravara. Ānk* names were mostly of those ancestors who had migrated first from the original place of concentration. Such *ānk* names are mentioned in various genealogies with or without the account of *purusha* in the agnatic line. *Ānk* means, according to a *Sanskrit-Hindi Dictionary* (Benares), the name of a person after whom the lineage runs. It might have derived, as some informants say, from the *ānk* (number). The *purushas* are mentioned in genealogies and there is no limit to their numbers as such. But generally only those are taken into account who have attained "fame" in some sphere of Brahminical occupations. Bajpai says that, besides the above implications, it also stands for the oldest living ancestors who are consulted and given priority in the observance of various social customs. In Narain Prasad Misra's genealogy we find mention only of *purusha* which include the *ānk.* (The latter is his +-marked famed ancestor *Pratisthit Purusha.*) Considering various opinions, it seems that this concept, which extends the account of agnatic kin, is a result of the conditions created by migration and social climate—both brought pressure to extend the kinship account. This, in turn, extended the zone of incest. *Purusha* is also an indicator of rank on the *biswa* scale. For example, among the Misra of Sandilya *gotra* who are concentrated at Mira-Sarai, there are four *purushas,* named (1) Sukhey, (2) Dweep, (3) Munney, and (4) Buddha under the *ānk* named Parsu. These all, except Buddha, have twenty *biswa:* Buddha has nineteen. In matters of marriage, the *ānk* alone is not sufficient; the *purusha* should also be cited. The latter helps to know accurately the incest zone as well as the definite rank on the *biswa* scale of the party concerned. Sripat Misra remarked that the significant conclusion which he could arrive at by going through the oldest available genealogies was that the "*Biswā* and *Āspad* changed according to one's adherence to Brahminical values." At present this amounts to the scrupulous observance of the establishment of a marriage bond as well as conduct regarding food, social interaction, and riches. This present concept of *kulinta* among these Brahmins shows a marked transformation of values from the one professed in the Bhagwata (as noted above). If any *ānk* ancestor and/or *purusha* had performed different big sacrifices in the past and thus changed his/their *aspad* accordingly (an example has been cited above), it functions as an evidence for justifying their rank (if high) and their claim (if low). But seldom does it imply today that they should also perform similar sacrifices. The opinion is that such

"big sacrifices as are required to change the *aspad* can not be successfully performed under present circumstances." The marriage institution is still a highly sensitive area in their social organization; if, therefore, in a marriage some rule is violated, the family is singled out for disapprobation and even degraded. The above concept of *kulinta,* i.e. emphasizing only certain values regarding marriage and commensalism, is practically the backbone of the present caste organization among Kanya-Kubjas. Bajpai is of the view that *aspad* changed more easily than did the *biswa.* We find four sons of one father, for example, Damā, Gopāl, Gobardhan, and Chattu who were awarded different *biswas* and *aspads* according to their deeds. "But once this allotment took place," according to Bajpai, "it scarcely changed later on."

It is important to note that at some places the concept of *ānk* and *susthan* is mixed up by some of the informants. They said "very few people know the details about the origin and number of *ānk* in one *aspad* of one *gotra.*"

Biswā-Scale

It is recognized by every informant that the *biswa* scale was developed much later than the post-Vedic and Puranic period. One can learn its approximate period of origin from the old genealogies. Prasad notes that in a hand-written genealogy nearly 500 years old, he did not find any mention of the *biswa* scale. He found this genealogy while reading Sanskrit in District Kheri. Again at the age of fifteen years, he discovered in the village of Bhimpur another genealogy less than 400 years old. This also does not directly mention *biswa* but the two stanzas of verse which are quoted in Prasad's genealogy undoubtedly express its association with the other elements of caste organization. For example, it is mentioned in connection with some *ānks* of the Bajpai *āspad,* such as Veteshwar, Buddhisharma, and Rama Chandra. In another Vanshavali, exactly 300 years old, this *biswa* scale was explicitly mentioned. When the above noted older scheme was compared with the present *biswa* ranking scheme for various *ānks* and *aspads,* it differed. Probably such differences led various authors to conclude that the *biswa* scale was a sliding one which could be adjusted in every generation according to the deeds of the people. But, as my informants agree, this mobility of the scale was very early lost and it moved towards more and more rigidity with significant and inherent economic implications. Current legends say that the *biswa* scheme was awarded to these Brahmins by some king in the historic past. Many informants agree that it was awarded by King Akbar at the instigation of Bir-Bal, a Bhāt Brahmin.[30] Those who stood near to the king accepted the *pān* (betel leaf) from his hand

30 Elphinstone, 1916, p. 508.

and were awarded twenty *biswa*, the highest in the scale, while those who did not were ranked below. Later on this scale developed to make twenty divisions on analogy with the traditional measurement of land (according to which there are twenty *biswas* to one *bigha*). There is another story, given in Prasad's Vanshavali, which seems to be less probable. According to it, the scale arose at the time of Jai Chand, the Hindu king, about 800 years ago (*Samvat* 1236) who performed a great *rajasuya yajna*. He spent enormous wealth and invited "all Kanya-Kubja Brahmins." When the *yajna* was completed, these Brahmins were invited to take food in the following order (a) Ascetics, (b) Vedvaktas (those who were well versed in the Vedas), (c) the wealthy, (d) the rulers, and finally (e) those remaining.[31]

In marriages, the girls are preferably married to the family of one higher in the *biswa* scale or, under unavoidable circumstances, to the one equal. They are ordinarily never married in families enjoying lower *biswas* than their own. A Kannaujia Brahmin of twenty *biswa* must marry his daughter only to one enjoying an equal rank, while the son must be married preferably in a family of equal rank, or, alternatively, in a family which is only three or four *biswas* lower, but not more. At the present, this ladder is the most important measure for determining the social status of the Kanya-Kubjas. Hence there is a definite tendency on the part of some people "to rise" in the *biswa* scale through marital bonds. For example, if A of ten *biswas* marries his daughter by producing a tempting dowry (or "even by force") to a man who ranks at twenty *biswas* he will do so because in this way the status of his family will be raised. Sometimes, if circumstances permit, people try to establish themselves as belonging to a rank of twenty *biswa* on the basis of such marital connections. (*Ānk* will also be changed accordingly.) These are called *Banuán* (artificially-risen group). Thus in future, A can demand a heavy dowry for his son because he is now of twenty *biswa*. On the other hand, if B of twenty *biswa* lacks a sizeable dowry and cannot marry his daughter to some one of equal rank, he is forced to marry downward. First, by such acts his social status is immediately hurt but after repetition of such occurrences, he is socially stigmatized and excluded. Those who rank low in the *biswa* scale try to relate themselves, by any possible means, to those higher in it.

31 Still others attribute a story to King Lakshmana Sen of Bengal. He established some kind of hierarchy among Brahmins. He performed a *yajna*, during which one morning he ordered the participating Brahmins to come to him. Those who came in the Brahmamuhurta (the morning hour which is usually set apart for worshipping the Brahma-Supernatural) were ranked low, because they thought the king's order to be more important than the worship of Brahma. Those who came in the noon were given high status because they were steadfast to their duty (Brahmana Karam). This episode, however, does not relate to the evolution of the *biswa* scale.

"The Biswa scale was invented," says Sripat Misra, "by Akbar with the help of those Brahmins who served at his court. It was introduced to destroy the unity of the Kanya-Kubja caste. It was this scale which sowed the seeds of bitter class rivalry, the dowry system, and of economic competition." A. P. Bajpai has made very insignificant mention of it in the preface to his book, while he does not mention it at all in the genealogical charts. He remarked, "The system is not only unnecessary but more and more harmful as long as it is perpetuated." He also thinks that this element was the root cause of the extreme restrictions regarding commensalism. The highest rank was "awarded to those who were rich and prominent in the eyes of the emperor Akbar." Thus, as a result, these people formed an endogamous group which was based on economic instead of ritual status. Learning and austerity, the duties of the Brahmin, were forsaken for the acquisition of wealth. A competition arose among these people to raise their economic status. The poor but "ritually pure group" became "low" (low in the *biswa* rank) in the eyes of the wealthier group, and social transactions such as marriage and commensalism were terminated with them. The preference and competition for acquiring economic status gave a death blow to the concept of Brahminical occupations—a concept which the Kanya-Kubjas had cherished and which held them together for centuries. Sripat Misra remarks, "This system has diluted the blood of ancient Rishis running in our veins and there should be complete reorganisation of Biswas according to deeds and duties, not according to wealth." I quote these remarks here to acquaint the reader with the line of thinking of a responsible man regarding the value of "blood purity" and restrictions on food and interdining even today. Regarding interdining, the informants say they have a principle that "we do not eat with one whose daughter we cannot marry" *(Jiski béti nahin, uski roti nahin)*. Not only this, there is another popular saying: "Eight Kannaujias and nine hearths."[32] For Kanya-Kubjas, even fire is polluted if touched and taken from their hearth by other people. Therefore they have to keep a hearth separate for getting fire from because they cannot take it from others. Risley reported a similar saying: "Three Kannaujias and thirteen hearths."[33] All this shows the extent of elaboration of customs and practices regulating commensalism among these Brahmins. Sripat Misra, who is now nearing seventy, said that he worked for the last forty years; through the press he carried on an intensive propaganda and toured to impress upon his caste mates that "Wealth is not new to Kanya-Kubja Brahmins; they have always had their share of it; therefore they need not be tempted to marry into wealthier families outside their circle. Wealth or no wealth, marry within to keep up 'blood purity.'" To propagate

32 Bajpai, 1946, p. 5.

33 Risley, 1915.

this idea, he said he toured very widely and spent thousands of rupees belonging to the Kanya-Kubja Association. He gathered as evidence "the genealogies of the big and rich families living in various places in India." The three distribution circles described earlier and devised by him were given as range limits for "inner ones within which they could intermarry." He showed me several articles which he published for this purpose from time to time in the periodical "Kanya-Kubja," published under the aegis of the Kanya-Kubja Association.

For the regulation of marriages, the structures shown in Figure 2 are operative at different levels among Kanya-Kubja.

IV

In general the Kanya-Kubjas are a high ranking, "status-conscious" group of north India Brahmins, isolating and demarcating themselves from every alien group in their socio-cultural practices. Concentration in space is still a characteristic and an "asset" for them. Sensitivity to lineage and descent has developed to an extreme. Even as elaborate a lineage reckoning system as is seen today required a concept of territorial localization in order to give its members a sense of ritual security. The economic aspect, as remarked by Kroeber,[34] has long remained a highly potent means as well as an end in accentuating the rate of fission within and between castes. One such example where an element of organization is perpetuated which is even today primarily based on economic value is the *biswa* among the Kanya-Kubjas, a practice much resented and half-supported by many. In the words of an informant, "It has created more problems of every kind than it has solved." It created class within caste which aimed to introduce the concept of intracaste vertical mobility based on economic rather than ritual values. But it has resulted in the creation and perpetuation of confusion and conflict among these people. The vertical mobility, which is observable today, is "artificial" and "harmful." The *biswa* scale became rigid just after its inception and did not change except "due to petension by some people." This is the opinion of many informants who rank high in the scale. Rich people, low in *biswa* rank, either buy their way upward by paying large dowries to marry their girls upward or simply climb up by denouncing outright the traditional system. Those who are poor but high in rank either regard it as devoid of economic implications and try to turn to profit their "ancestor-pride" or if there is no other alternative, "climb down." Since the daughters were to be given to those "higher" and sons to those "equal" or nearly equal in the *biswa* scale, those on lowest rungs gave brides but did not find them from above. Therefore, they took them, as reported, from "out-

34 Kroeber, 1948, pp. 750-752.

side." Thus an intracaste hypergamy is operating. There is a marked tendency among these Brahmins to concentrate towards the "top" of their ladder (see Fig. 2, lower figure). *Biswa* cleaved the group and became antithetical to the very basic concept of the caste, viz. endogamy organized on the basis of ritual values. It

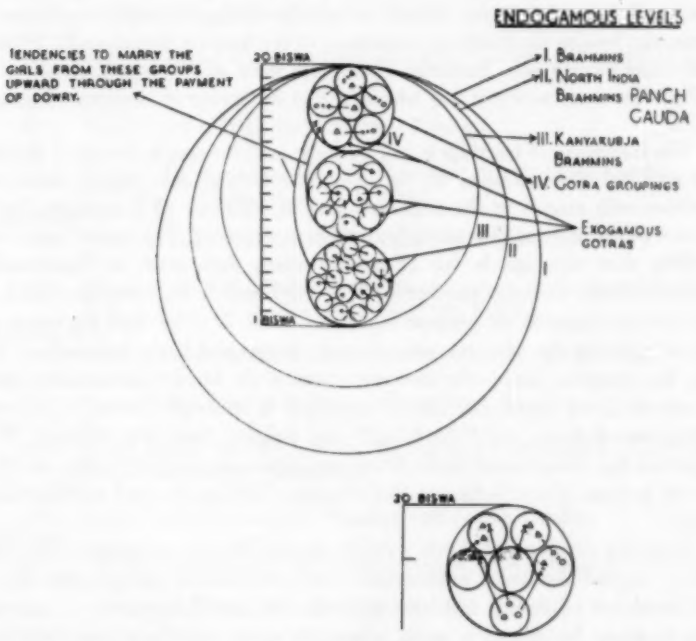


FIG. 2. Diagram of endogamous levels. The lower diagram illustrates the tendency to acquire status resulting from hypergamy.

created a crisis of values. Though it debased ritual values from their functional responsibility in certain fields of social interaction, it could not be an effective substitute and thus became the cause of perpetual controversy and reaction. It seemed to work quickly as a veritable dye of differentiation, in association with enhancing the importance of *susthan* and the *ghara*. But the economic basis of this differentiation ran against those in vogue in the social structure of these people

and therefore *biswa* created trouble both ways, e.g. in the structure of values as well as the society. Today, however, the *biswa* concept is not free from ritual flavor, though essentially it has functioned to award an ever-widening economic base to the social structure of these people. It is suggested that as a result of this concept discrimination for commensalism attained its pinnacle and money for marriage became a necessity. *Aspad,* an element changeable with ritual attainments, also became fixed with the curtailment of the freedom of performing Hindu rites under foreign rule. Formerly, *Kulin* were those who practiced certain prescribed values, and now it is they who belong to the lineage of ancestors who were *Kulin.*

The institution of marriage is still the most sensitive area in the social organization of the Kanya-Kubjas. If, therefore, one deviates only slightly from the tradition with respect to the settlement and performance of a marriage, he is at once picked out for disapprobation and even degraded. The second zone, less sensitive than marriage, is that of commensalism. Both areas are functionally interrelated and mutually reinforcing. The third zone is the economic, which is fast coming to assume the greatest importance of all. It is here that the course of events regarding the other two zones is really determined in the last analysis. Of late, the economic factor—the economic status of the family—has assumed such an overwhelming importance that it has begun to outweigh the traditional considerations of *biswa* and "blue-blood," and judging from this tendency, it is apparent that the economic factor has become the main, if not the only, criterion for the purpose of establishing marital relations, "both in the rural and the urban areas."

From the trends noted above, it can be asserted that in comparison with other castes, Kanya-Kubja social organization reveals considerably greater sensitivity to the restriction of marital bonds in particular and social interaction in general. The tendency for change in social interaction again must have been correlated with and catalyzed by the social history of the country. When favored values of a society such as "blood purity" are subjected to alien attack, a reaction becomes inevitable in which there is an effort to keep up the traditional way. Kanya-Kubjas are a good case in point. Therefore, looking diachronically, we may find here a society which reacted repeatedly to attacks with all organizational forces at its disposal in order to prevent "functional disunity." From time to time it developed various lines of "defence" which may, with or without shift of emphasis, be present as the elements of its caste organization even today. This may do well as

a workable assumption which may be tested to an extent in the background of the available historical data on the caste and fluctuating regional social climate.[35]

Bibliography

Bajpai, A. P.
1946 *Upmanyu Vanshavali* (Pathar Gali Kashi: Benares).

Crooke, W.
1896 *The Tribes and Castes of North-Western Provinces and Oudh* (4 vols., Calcutta).

Elphinstone, M.
1916 *The History of India* (John Murray: London).

Fick, R.
1913 "Gotra" (in *Encyclopaedia of Religion and Ethics*, James Hastings, ed., T. T. Clark: Edinburgh and New York).

Ghurye, G. S.
1957 *Caste and Class in India* (Popular Book Depot: Bombay).

Griswold, H. D.
1931 "Brahminism and Hinduism" (in *Encyclopaedia of the Social Sciences*, E. R. A. Seligman, ed., Macmillan Co.: New York).

Kroeber, A. L.
1948 *Anthropology* (revised ed., Harcourt, Brace and Co.: New York).

Misra, Narain Prasad
1959 *Kanya Kubja Vanshavali* (Vankateshwar Press: Bombay).

Misra, Sripat
1959 *Kanya Kubja* (Special number, An organ of Kanya Kubja Association, Kanya Kubja Press: Lucknow).

Prabhu, P. N.
1954 *Hindu Social Organisation* (Popular Book Depot: Bombay).

Risley, H.
1891 *The Tribes and Castes of Bengal* [Kannaujias in Bengal] (2 vols., Calcutta).
1915 *The People of India* (Thacker, Spink and Co.: Calcutta).

Shastri, S. R.
1954 *Aspirations from the Fresh World* (Bhartiya Vidya Bhawan: Bombay).

Williams, M. M.
1899 *Sanskrit-English Dictionary* (Repr. 1951, Clarendon Press: Oxford).

Kanyakubja College
University of Lucknow
Lucknow, India

35 Further discussion on this aspect of the caste organization of Kanya-Kubja Brahmins has been curtailed because of the lack of space. It will be dealt with more fully in a separate paper.

SAILING RAFTS OF SECHURA: HISTORY AND PROBLEMS OF ORIGIN*

CLINTON R. EDWARDS

THE SECHURA RAFTS

ONE of Peru's most picturesque sights occurs almost every fair-weather day along the lengthy stretch of sandy beach south of the town of Sechura. Far out to sea from various small hamlets with names like Chuyllache, Palo Parado, Matacaballo, or Parachica, dozens of white specks appear on the azure horizon. As they draw closer, the specks resolve into the sails of the local fishing fleet, returning to shore on the afternoon breeze. When the craft are near enough for their crews to be discerned, the fishermen seem to be standing in the sea itself until a closer look reveals that they are borne by rafts of light-colored logs. As one of these strange looking vessels approaches the line of breakers its large high peaked sail seems out of proportion to the small bundle of logs, and as it skims through the surf it seems in imminent danger of capsizing. One by one the rafts careen through the breakers and glide through the shallows to shore, and the crews jump over the side into knee-deep water to draw them onto the beach.

The hull, fifteen to twenty feet long, is composed of from five to eight balsa-wood logs of approximately equal length (Plate 1, left). Diameters of the logs vary from eight to twelve inches, making a rather uneven upper surface with a width of five or six feet. The two largest logs acquired by the builder are placed on the outside to impart as much stability as possible. Most logs for raft construction are purchased from Guayaquil in Ecuador, although some driftwood logs which have drifted southward on variable inshore currents from the Gulf of Guayaquil may be picked up along the local beaches. Present-day restrictions on imports from Ecuador have made good balsa-wood logs difficult to obtain as well as costly.

The logs are fastened together at bow, stern and amidships by means of three crosspieces *(corbatones)* of local *algarrobo* wood. These are chosen and cut so as to fit the irregularities caused by the varying diameters of the logs. Lashings are of line *(trinca)* spun locally from the strong fiber *(cabuya)* of a *Fourcroya,* a cousin of the plant from which the Mexican sisal is made.

* This paper represents a portion of field work during 1957-58 on primitive craft of western South America, supported by the National Academy of Sciences-National Research Council, Division of Earth Sciences.

Hull fittings are a set of railings *(barrotes)* and a sculling fulcrum *(bogadero)*. The railings, of *algarrobo* or *caña de Guayaquil* (the New World giant "bamboo"), are supported by thick blocks *(mozos)* of balsa-wood. The whole assemblage is lashed to the stern and midship crosspieces, and extends from just forward of the mast well back to the stern. The railings serve as handholds while sailing or as a bench when planks are placed across them. The sculling fulcrum is a squared block of balsa-wood lashed to the after end of the center log, providing leverage when sculling from the stern.

The twelve to fourteen foot mast *(mástil, palo)* of *caña de Guayaquil* is stepped in a wide, thick block of balsa-wood or hardwood with a shallow hole to receive the heel. Heavy lashings *(muras)* leading downward from about two feet above the deck to the midship crosspieces function as mast partners. A headstay *(brandal de proa)* and backstays *(brandales de babor* and *estribor:* port and starboard) leading from the truck of the mast to the fore and after crosspieces comprise the standing rigging. The yard *(antena, embergo)* of *caña de Guayaquil,* slightly shorter than the mast, is hoisted by means of a halyard *(lisero)* which is rove through a block *(motón)* at the top of the mast. This block is sometimes "store bought," with a metal sheave, but more often is a rounded piece of hardwood with a hole bored through it to receive the line. To keep the yard from chafing against the mast, a small block of hardwood *(grisa)* is lashed to the truck. Another piece attached to the yard bears on this and takes the continual chafing at this point while sailing.

The loose-footed cotton lug sail is trapezoidal in cut, the luff being shorter than the leech. A boltrope is sewed around the entire perimeter, with rope cringles at the four corners. A fifth cringle is attached to the luff about halfway between throat and tack; this receives the outboard end of the *botalón,* a light wooden spar with a thumb cleat at the outer end which fits into the cringle. The inboard end is lashed to the mast about five feet above the deck. This spar is rigged when sailing to windward to keep taut the leading edge of the sail.

Completing the equipment of the raft are three one-inch hardwood planks, about one to one and one-half feet wide by six or eight feet long, tapered to a point at one end. When used as centerboards they are called *quillas* (keels); when used as sculling oars they are referred to as *remos* (oars). The stern board, when used to direct the course of the raft, is the *timón* (rudder).[1]

1 The ancient Indian word for these centerboards was *guare,* as noted by Juan and Ulloa, *Relación Histórica del Viaje a la América Meridional* (Madrid, 1748). In the first (1758) and subsequent English editions, the word is misspelled as "guara." This misspelling has persisted in the literature in English of these rafts.

METHOD OF SAILING

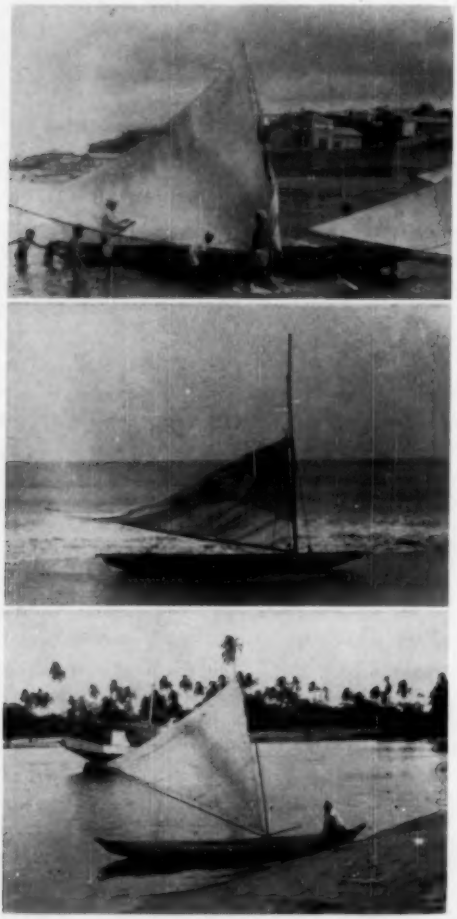
Early in the morning the fishermen, bearing their sails, fishing gear, and food for the day, walk down to the beach to ready their craft for the day's fishing. The usual crew is two men, one of whom is the owner. Their first task is to check all the lashings which hold the raft together, and take up on any which had worked loose the day before or slacked off because of drying out. The sail is secured to the yard by first tying the peak to one end, then stretching the head tight and securing the throat. The lashings between are then tied around the yard. The halyard is made fast to the middle of the yard, and sail and yard are hoisted about two-thirds of the way up the mast. The sail is furled against the mast and secured until ready for use by taking several turns with the hauling part of the halyard. The gear is put aboard, consisting of centerboards, anchor (*ancla*, a large round rock with a stout stick tied to it), fishing gear, food, and a couple of spare centerboards to place across the railings for seats.

When ready to launch, two wooden rollers *(bolines)* are set under the raft. Where the sand is soft, centerboards are used under the rollers to provide a firm surface. The raft is rapidly pushed down the beach to the water, and when it floats the rollers are tossed back up the beach.

After waiting for the right wave to roll in, the fishermen push the raft into deeper water and spring aboard to scull it through the surf. The helmsman sculls with the board which is to serve later as the rudder, while the crewman uses one of the other centerboards. The wide planks are rather unwieldy as sculling oars or paddles, but despite the fact that many of these fishermen have seen different kinds of oars and paddles they stick to their own type which, indeed, is economical in terms of its multiple use in this region where good wide pieces of wood are scarce. The sculling motion is different from that seen in Europe and North America: instead of a "figure-eight" motion, the Sechura fishermen slide their oars flatways into the water and shove forward on the upper end, using the *bogadero* at the stern or the forward crosspiece as fulcrum. At the end of each shove they turn the oar so that it trails vertically through the water, and bring the upper end back for another stroke.

When the raft is well beyond the surf the sail is cleared for hoisting. As the helmsman heads the raft into the wind or slightly toward the tack he wants to take, the crewman hoists the sail until the yard is two-blocked against the chafing strip at the masthead. The halyard is tied off to the midship crosspiece. The tack of the sail is tied down to an outside log near the bow on the windward side, and the sheet is led aft to the helmsman. When the sail is set, but before sheeting it in, two centerboards are thrust down between the logs, one near the bow and the

Left: Sailing raft of Sechura.
Center: Sailing onto the beach. The stern centerboard is being used as a steering oar.
Right: Balsilla with mast unstepped. Oar, centerboard, and fishing gear are aboard.



Upper: Seagoing dugout canoe at Manta, Ecuador.
Center: Balsilla at Playas. The gaff of the sail has been lowered.
Lower: Cayapa Indian canoe at Cojimíes, Ecuador.

other just aft of the mast, both on the leeward side. The *botalón* is set, and the helmsman sheets in the sail, thrusts his board between the logs at the middle of the stern, and commences to steer his course.

When the raft is hard on the wind or reaching, the fore and midship centerboards are adjusted for a sailing balance, and then left in place. The stern board is continually moved up and down, and it is this motion which causes changes in the balance of the raft which in turn cause changes of course. Relatively slight movement is required to maintain the balance against wave action and tendencies to head up or bear off in response to varying wind pressure on the sail. The centerboards provide lateral resistance to the water, preventing leeward drift in the same manner as the centerboard or keel of a conventional sailboat. By raising the stern board less lateral resistance is provided at the stern, causing a weather helm. Thus the sterns drifts away from the wind in response to the imbalance, and the course of the raft is changed slightly toward the direction from which the wind is blowing. Conversely, when the stern board is shoved down, a lee helm is imparted to the raft, causing the bow to fall off away from the direction of the wind. When a quick, radical change of course is desired, the board is shoved about halfway down, and worked from one side to the other, levering on the slot between the logs. Thus the stern is shoved sideways in a series of jerks until the raft is headed in the desired direction.

If the breeze is strong and puffy, the sheet must be kept ready to slack off and spill some wind from the sail, since this manner of steering does not allow for rapid heading up to a luff as in a conventional sailboat. In a strong steady wind the raft may heel considerably, with the leeward logs awash. Under these conditions the crewman braces a spare centerboard on the railings in the manner of a hiking board and climbs out to windward to counterbalance the heel with his weight. With a good breeze the rafts will skim along at four or five knots on the wind, a respectable speed for any sailboat their size.

In changes of course necessary for working to windward, the Sechura seamen almost never tack by coming about into the wind, although it is possible if there is enough breeze for the raft to carry its way around. Jibing is much simpler in view of the manipulations necessary to get the lug sail around and squared away for the other tack. In jibing the sheet is payed out until the pressure is off the sail, and the *botalón* is unshipped. While the helmsman works the stern around away from the wind in the aforementioned levering action, the crewman shifts the centerboards over to the new leeward side. He then passes the sheet forward around the luff of the sail, hauling the canvas around and at the same time dipping the yard so that it swings to the other side of the mast. The tack is shifted to the

new weather bow and tied to the outside log, and the sheet is passed aft to the helmsman. After the *botalón* is rigged and the centerboards adjusted for balance, the raft is put on her new course.

On a broad reach and running free the sheet is payed out and the centerboards are removed from between the logs. The stern board is then used as a more conventional steering oar, outside the logs at the stern, the *bogadero* or the end of the slot alongside the center log serving as fulcrum.

Coming in to the beach (Plate 1, center) the fore and midship centerboards are unshipped, and the stern board is used as when running free. If the wind is adverse the sail is dropped, and the fishermen scull their raft through the surf. They usually sail in, however, since the prevailing afternoon breeze along the Sechura coast is onshore. If the surf is running high they have a wild ride through the breakers and capsizes are not infrequent. The crew who under these conditions drop sail and scull in are the butt of ridicule by the more venturesome individuals who have sailed through the breakers. When the raft is grounded in the shallows, one man holds its bow on to the beach while the other runs up to get the rollers. The raft is rolled up the beach with the aid of the wind in the sail. The sail is left up to dry while the fishermen clean and salt their catch and talk over the day's events. When the work is done the centerboards, rollers, and yards are stowed beneath the rafts and the fishermen shoulder their loads of fish and sails for the homeward trek.

Small balsa-wood rafts of similar construction but without sails and centerboards are used extensively in northern Peru for lightering cargo from the beach and as life rafts on conventional sailing and powered fishboats. Small sail-less rafts are also used for fishing north of Sechura, at small fishing hamlets strung along the base of the peninsula which separates the bays of Sechura and Paita. Curiously, these non-sailing types are propelled by paddles shaped exactly like the centerboards of the sailing rafts. The sculling motion is the same shoving and trailing action. Despite the clumsiness of the centerboard-shaped paddles, the native seamen have retained them in preference to other types, although they have seen more manageable oars and paddles in nearby Paita and other ports.

The sailing raft and technique of centerboard navigation here described have been considered extinct by modern authors concerned with aboriginal craft of Peru and the Eastern Pacific,[2] and indeed the isolated half-dozen or so beach

2 S. K. Lothrop, *Aboriginal Navigation off the West Coast of South America* (Journal, Royal Anthropological Institute, vol. 62, pp. 229-256; London, 1932); James Hornell, *Water Transport* (Cambridge, 1946), pp. 81-82; Thor Heyerdahl, *American Indians in the Pacific* (United States ed., Rand McNally, 1953), p. 544; Heyerdahl, *Guara Sailing Technique In-*

hamlets south of Sechura are last outposts of their existence (Fig. 1). Although a few small sailing rafts may be seen at more frequently visited ports such as Máncora, Lobitos, and Talara, they have apparently escaped notice among the

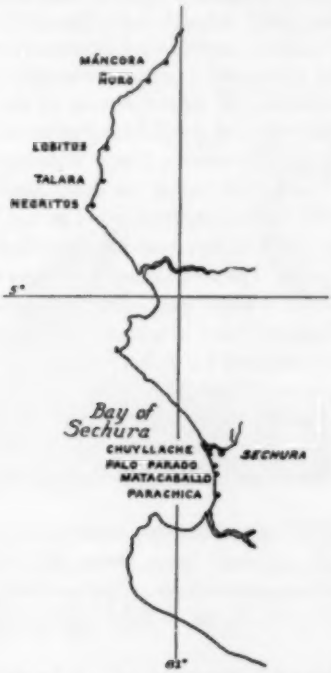


FIG. 1. Distribution of Peruvian sailing rafts, 1958.

cargo rafts, life rafts, and modern craft which line the beaches. These Sechura rafts are the direct descendants of vessels built by the pre-Columbian native mariners, and as we shall see, this type of craft has been in continuous use since ancient times.

---

digenous to South America (Actas del XXXIII Congreso Internacional de Americanistas, San José, 1959), p. 340; Richard LeBaron Bowen, Jr., *Eastern Sail Affinities* (American Neptune, vol. 13, no. 2, April 1953), p. 89.

SAILING RAFTS OF THE 17TH, 18TH, AND 19TH CENTURIES

Many world travelers, traders, and naval officers have remarked on the strange craft found along the Peruvian and Ecuadorian coasts, and in their journals are found numerous descriptions, comprising a fairly continuous record of the appearance of the rafts since early colonial times. Especially interesting are the comments of experienced seafaring men on their construction and sailing qualities.

William Dampier, the oft-quoted trader and sometime pirate who has contributed much to our knowledge of remote corners of the world in the latter 1600's, wrote detailed descriptions of small fishing rafts and large cargo vessels engaged in coastal trade between western South American ports. Cargo rafts were up to forty feet in length, with one or two decks above the main hull. The main deck held large stones for ballast, fresh water in jars, and whatever cargo could stand wetting, since the hull logs were submerged some two or three feet when the raft was fully loaded. The crew's quarters were on the second deck, and dry cargo was carried on top. A single mast carried a large sail "as in our West-Country Barges in the Thames"—that is, a square sail hoisted on a yard. Craft of this type were evidently designed for drifting voyages, for Dampier says they were incapable of sailing to windward. They made one-way trips "as from Lima to Truxillo, or Guiaquil, or Panama," taking advantage of the north-setting current and favorable winds. At destination, the raft was broken up and sold as timber, and the crew booked passage on a Spanish ship for the windward journey back to Peru.

Smaller rafts used for fishing and carrying water and cargo to European ships also carried mast and sail, and were "more governable" than the large coastal vessels. Dampier does not mention centerboards, but they were used before and after his time, as we shall presently see, and the smaller rafts seen by him probably carried them.[3]

The earliest good illustration showing details of the rigging of a square sail on a raft is contained in Juan and Ulloa's 1748 account of a Spanish voyage to South America during the 1730's (Fig. 2). The journal contains a lengthy description of maneuvering by means of centerboards which corresponds quite well to the method of present-day Sechura fishermen. Juan and Ulloa were impressed with the seaworthiness and sailing qualities of the rafts, and recommended use of similar craft with centerboards as life-saving equipment on European vessels.[4]

3 William Dampier, *A New Voyage Around the World* (London, 1703), pp. 142-143.

4 J. Juan y Santacilia and A. de Ulloa, *Relación Histórica del Viaje a la América Meridional hecho de orden de S. Mag* . . . (Madrid, 1748), Lib. IV, Cap. LX, p. 264 ff.

Captain David Porter, a United States naval officer who cruised South American waters during the War of 1812, included in his journal an excellent account of rafts at Paita. Two vessels which he intercepted just off the port were bound from Guayaquil to Huacho. Although Captain Porter was not overly impressed with the appearance of the rafts, he wrote: ". . . it excited no little surprise in

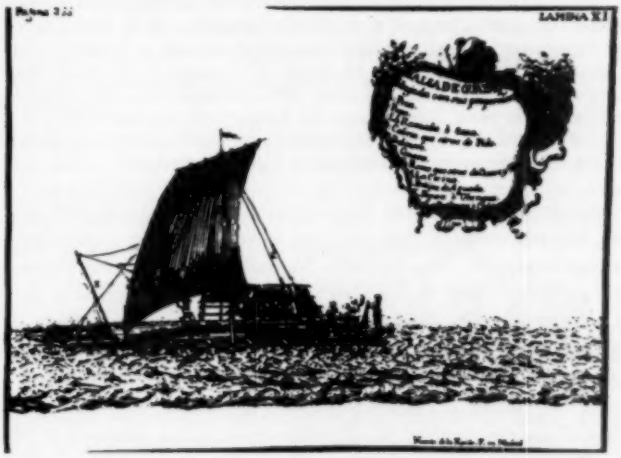


FIG. 2. Sailing raft of Guayaquil (from Juan and Ulloa, 1748). The cartouche indicates the following features: A. bow; B. stern; C. deckhouse; D. set of sheers which serve as mast; E. bowline (lines attached to the luff of the sail, extended by a sprit); F. *guares*, centerboards; G. oar which serves as centerboard and rudder; H. galley; I. water jars; K. backstays; L. deck.

our minds when we were informed, that the navigation from Guayaquil to Lima, a distance of about six hundred miles, against a constant head wind, and frequently rapid current, should be very common with those rafts." He describes the centerboards, rigging and single mast of a twenty-five to thirty foot raft, which was propelled by a "large lug-sail made of cotton." This is the earliest record of a lug-sail in use on one of these craft.[5]

5 David Porter, *Journal of a Cruise made to the Pacific Ocean, by Captain David Porter in the United States Frigate Essex, in the years 1812, 1813, and 1814* (2nd ed., 2 vols., New York, 1822), vol. 1, pp. 123-124.

In 1823 Captain Benjamin Morrell encountered sailing rafts at the Lobos Islands, manned by Peruvian Indians who had come to hunt seal, fish, and gather birds' eggs. Captain Morrell describes the hull and rig thus:

> This craft is composed of a number of large logs of a light and buoyant nature, lashed together with cordage made of a certain species of grass. They are generally from twenty to twenty-five feet in length, and sometimes even fifty feet. In the middle there is raised a kind of box, three or four feet in height, for the better security of the mast, which is stepped in the centre bottom log. They have likewise a short bowsprit rigged out forward, to which the tack of the sail is fastened. The latter is nearly square, and bent to a yard, by which it is hoisted to the mast, the halliards being bent on to the yard about one-third of the distance from the forward end; the other end, abaft the mast, being always the longest and the most elevated. The tack of the sail is then hauled down to the extremity of the bowsprit; and the after-leach, or sheet, is hauled aft, in the same manner as a ship's mainsheet.

From this description it is clear that the rafts carried lug sails. Of their sailing qualities, Morrell wrote: "They will beat to windward like a pilot boat. . . ."[6] On another voyage to Peru in 1825, Morrell again saw some Peruvian rafts, this time at Paita. These he describes as carrying single masts with square sails. "With this simple rigging these rafts will sail six or eight miles an hour, on a wind, making little or no lee-way, which is prevented by a number of paddles that are thrust down between the logs and serve the purpose of lee-boards."[7]

George Coggeshall, a Yankee sea-captain and trader, described rafts at Lambayeque and other ports along the Peruvian coast as they appeared in 1826. They were used extensively as cargo lighters for visiting sailing ships. "Without the aid of these balsas, there could be little or no communication with the shore on this part of the Peruvian coast, where there are no harbors for several hundred miles; and thus all the goods that are landed or shipped . . . are transported by the Indians on balsas." After a brief description of the hull, deck, and single mast, Coggeshall comments: "They are admirably adapted to landing and going off through the surf, where no other boat could live or be safe under like circumstances." He also mentions their use in coastal navigation, and points out their ability to beat to windward by use of centerboards.[8]

6 Benjamin Morrell, *A Narrative of Four Voyages, to the South Sea, North and South Pacific Ocean, Chinese Sea, Ethiopic and Southern Atlantic Ocean, Indian and Antarctic Ocean* (New York, 1832), p. 120.

7 *Idem*, p. 223.

8 George Coggeshall, *Thirty-six Voyages to Various Parts of the World, Made Between the Years 1799 and 1841* [Selected from his MS. Journal of eighty voyages] (3rd. ed., New York, 1858), p. 477.

W. B. Stevenson's description of rafts on the Guayas River of Ecuador is not quite clear on the type of sail carried: "Instead of a mast, the sail is hoisted on two poles, or sheers, of mangrove wood, inclining a little forward, being supported by two backstays. The sail is a large square lugsail, with halyards and braces." The presence of braces indicates that it was probably a square rather than a lug sail; the rig seems to have been like that described almost a century earlier by Juan and Ulloa. Stevenson reports that sailing rafts made voyages from Guayaquil to Paita, Sechura, Pacasmayo and Huanchaco, "beating up against the wind and current a distance of four degrees of latitude, having on board five or six hundred quintals of goods as a cargo, besides a crew of Indians and their provisions."[9]

At Guayaquil Captain Basil Hall saw many rafts, and was highly impressed by their sailing ability. He wrote: "Of all the ingenious native contrivances for turning small means to good account, one of the most curious, and, under certain circumstances, perhaps the most useful, is the Balsa, or raft of South America. . . ." He tells of rafts fifty to sixty feet long, used in coastal trade.

> The Balsa generally carries only one large sail, which is hoisted to what we call a pair of sheers, formed by two poles crossing at the top, where they are lashed together. . . . It is truly astonishing to see how fast these singular vessels go through the water; but it is still more curious to observe how accurately they can be steered, and how effectively they may be handled in all respects like any ordinary vessel.

Hall comments on the potential use of centerboard rafts as life saving equipment, and gives a detailed description of maneuvering by centerboards, apparently inspired by an English translation of Juan and Ulloa. Of a Paita raft he writes:

> I shall never forget the sensation produced in a ship I commanded one evening on the coast of Peru, as we steered towards the roadstead of Payta, so celebrated in Anson's voyage, and beheld an immense Balsa dashing out before the land wind, and sending a snowy wreath of foam before her like that which curls up before the bow of a frigate in chase. As long as she was kept before the wind, we could understand this in some degree; but when she hauled up in order to round the point, and having made a stretch along shore, proceeded to tack, we could scarcely believe our eyes. Had the celebrated Flying Dutchman sailed past us, our wonder could hardly have been excited more.[10]

An account of two cruises on the Pacific Station by "An Officer of the United States Navy" (W. S. W. Ruschenberger) describes rafts at Lambayeque in 1833.

9 W. B. Stevenson, *Historical and Descriptive Narrative of Twenty Years' Residence in South America* (London, 1829), vol. 2, p. 222.

10 Basil Hall, *Fragments of Voyages and Travels* (3rd. series, vol. 2, London, 1833), pp. 80ff.

They were used for lightering cargo from the beach to sailing ships and for voyages to Guayaquil. Ruschenberger describes the method of launching a large cargo raft from the beach:

> All being ready, the square sail was hoisted, and one end of the balsa pushed off towards the breakers, while the other was retained on the beach by a rope held by a party of Indians on shore. Presently the sail filled, a heavy wave broke roaring on the beach, sending a sheet of foamy water towards the shore, and our balsa was afloat. The balseros who had been bearing off the bow of the vessel, or rather raft, gave a shout, jumped on board, and the rope was let go. The sail was now sufficient to urge us steadily through the surf into the open sea, aided by broad paddles, called rudders, which the Indians worked cheerily. As we got into deep water, several short planks were forced down between the logs, giving steadiness, and, like the keel of a ship, keeping the balsa near the wind.[11]

Although not a seafaring man, Thomas J. Hutchinson had occasion to remark on the rafts of San José, the port for Lambayeque, where passengers arriving on steamers and sailing ships were ferried ashore by Indian raftsmen. The rafts carried "large square lugger" sails and several centerboards which were "so regulated as to influence the steering qualities in reference to the point from which the wind is blowing." As for the landsman's viewpoint on sailing qualities: "the motion is very pleasant, neither rolling nor pitching; but rising gently over the comparatively calm water this morning."[12]

In summary, several important points may be taken from these accounts of the past three centuries. Most seafaring men were favorably impressed with the sailing qualities and maneuverability of the rafts, and made special mention of the strange manner of steering by centerboards, unknown to European and North American mariners. Large rafts regularly made long voyages carrying considerable cargo, both with and against the set of the current and the prevailing wind. All descriptions of Peruvian rafts indicate a single mast with square or lug sail, whereas rafts from the River Guayas in Ecuador had sheer masts comprised of two poles in the form of an inverted "V", always supporting a square sail.

The lug sail, presently used on the Sechura rafts, came into use sometime in the early 1800's, probably introduced from Europe or North America. It gradually replaced the square sail in Peru, the latter finally disappearing sometime during the early part of the present century. Elderly fishermen in Lobitos and Ñuro recall voyages of their youth to Guayaquil in large rafts carrying square sail.

11 W. S. W. Ruschenberger, *Three Years in the Pacific, including notices of Brazil, Chile, Bolivia, and Peru, by an Officer of the United States Navy* (Philadelphia, 1834), p. 413.

12 Thomas J. Hutchinson, *Two Years in Peru, with Exploration of its Antiquities* (London, 1873), vol. 2, pp. 217-219.

The rigging of the square sail shown in Juan and Ulloa's drawing exhibits features which are unmistakably European. The sprit at the bow and the bowline attached to the leading edge of the sail are known to have been in use by the 14th century in Europe, and perhaps much earlier. Bowlines are necessary to keep taut the luff of a square sail when sailing on the wind. A drawing by Paris, included in his treatise on native craft of the world, shows a bowline attached to the raft's bow, as well as a set of braces on the yard of the square sail (Fig. 3).

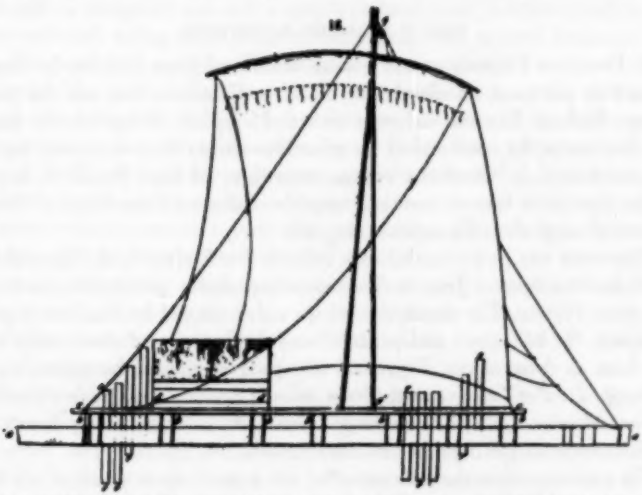


FIG. 3. Sailing raft of Guayaquil (from Paris, *Essai sur la construction navale des peuples extra-europeens*, Paris, 1841-43).

Dampier likens the raft sails to those of "West-Country Barges in the Thames"; Morrell tells of a bowsprit; Stevenson mentions braces on the yard. The probability is very great that this gear associated with square sails in South America came into use as the result of introduction by Europeans.

English and French copies of Juan and Ulloa's raft drawing have been proposed by Lothrop, Means, and Heyerdahl[13] as representing the aboriginal type of raft and sail plan, and this is the type of rig used by Heyerdahl on his raft "Kon-Tiki" and in his experiments with centerboard maneuvering. He included

13 Lothrop, *op. cit.*; Philip A. Means, *Pre-Spanish Navigation off the Andean Coast* (American Neptune, vol. 2, no. 2, 1942); Heyerdahl, *op. cit.*

some of the foregoing descriptions and illustrations in his discussion of aboriginal raft navigation in the East Pacific,[14] but made no distinction between sailing rigs of colonial and post-colonial times and those described by early chroniclers. These assumptions, that no changes had taken place since aboriginal times, and that eighteenth and nineteenth century illustrations and descriptions represent aboriginal sail and rig, need further investigation in view of the European features associated with the square sails.

EARLY SPANISH ACCOUNTS

On Francisco Pizarro's second voyage southward from Panama he found it necessary to put in at an island near Tumaco, Colombia, and sent his partner Almagro back to Panama for more men and supplies. Meanwhile he sent his other ship under the command of the pilot Bartolomeo Ruiz to explore the coast to the southward. It was on this voyage, somewhere off Cape Pasado in Ecuador, that the Spaniards first encountered tangible evidence of the riches of Peru, in the form of cargo aboard a native sailing raft.

This event was first recorded in a *relación* for Carlos V, the Spanish king, written by his secretary, Juan de Sámano, who probably got his information first hand from Pizarro. The description of the raft captured by Ruiz reads in part as follows: "It had masts and yards of very fine wood, and cotton sails of the same form as those of our ships, and very good rigging of henequen, which is like hemp. . . ." *(Traia sus mástiles y antenas de muy fina madera y velas de algodon del mismo talle, de manera que los nuestros navíos, y muy buena jarcia del dicho eneguen que digo, que es como cáñamo. . .)*.[15]

The statement that the sails were "of the same form as those of our ships" was interpreted by Prescott as referring to square sails,[16] and later writers have followed suit. If Sámano was repeating or paraphrasing a remark by Pizarro, referring to the similarity of the raft's sails to those of his own ships, the statement may be interpreted to mean a different kind of sail. On his second voyage

14 Heyerdahl, *loc. cit.* See also Thor Heyerdahl *The Voyage of the Raft Kon-Tiki* (The Geographical Journal, vol. 115, March, 1950); *Voyaging Distance and Voyaging Time in Pacific Migration* (The Geographical Journal, vol. 117, March, 1951); *The Balsa Raft in Aboriginal Navigation off Peru and Ecuador* (Southwestern Journal of Anthropology, vol. 11, pp. 251-264, 1955); *Guara Sailing Technique Indigenous to South America* (Actas del XXXIII Congreso Internacional de Americanistas, San José, 1959).

15 Juan de Sámano, "Relación de los primeros descubrimientos de Francisco Pizarro y Diego del Almagro, sacada del Códice número CXX de la Biblioteca Imperial de Viena" [Written in 1526] (in *Colección de Documentos Inéditos para la Historia de España*, Madrid, 1844), vol. 5, p. 196.

16 W. H. Prescott, *History of the Conquest of Peru* (London, 1847), vol. 2, p. 223.

Pizarro took two of the five or six small vessels built on the Pacific side of Panama up to that time. Ruiz' command was a small caravel of about forty tons. Small caravels and brigantines of Pizarro's time were commonly fitted out with lateen rig rather than the square rig (often with lateen mizzen) of larger ships. Thus the reference to the raft's sail could mean lateen-like. This seems to be corroborated by the use of the word *antena* rather than *verga*, referring to the yards. The word *antena*, as used by Spanish-speaking seamen, refers specifically to the yard of a lateen sail—a triangular sail with a steeply inclined yard like those used on Arab dhows and small sailing craft of the Mediterranean Sea, parts of India and Indonesia. The yard of a square sail was and is called *verga*.[17]

Gonzalo Fernando de Oviedo y Valdés was an official chronicler during early Spanish days in the New World. He had first-hand information from the members of Pizarro's expeditions along the west coast of South America, particularly from Almagro. In Oviedo's account of the capture of the raft off Cape Pasado he states specifically that the sail resembled a lateen sail: ". . . he saw a ship coming over the horizon which presented a great bulk, resembling a lateen sail, and the master and those with him prepared to fight if necessary . . ." (. . . *vido venir del bordo de la mar un navio que haçia muy grand bulto, que parasçia una vela latina, y el maestre é los que con él yban se aparejaron para pelear, si fuesse menester.* . . .)[18] Oviedo also wrote of the rafts of Puná Island, in the Gulf of Guayaquil, stating that they carried lateen sails *(velas latinas)*.[19]

Thus the shape of the sails on the first native sailing rafts seen by the Spaniards was lateen-like, or triangular, rather than square.

Another early account which describes rafts of the Ecuador-Peru coast is that of Pedro Gutiérrez de Santa Clara, a *mestizo* soldier born in the New World, probably in Mexico. He spent many years traveling in Peru during the second and third decades after the Spanish conquest, and had the admirable practice of keeping a journal of his travels and adventures. In later years he expanded this journal to a sizeable history which contains many remarks on the native people, including a description of rafts used by coastal Indian fishermen and traders. This reads in part: "The Indians of the town of Paita, of Puerto Viejo [the Manabí coast of Ecuador], of Túmbez, and of the island of Puná, and those of the entire coast, used from time immemorial and use today, rafts of light, dry

17 "Antena" and "embergo," a variant of "verga," are both used by present-day Sechura fishermen in referring to the yard of their lug sail.

18 Gonzalo Fernando de Oviedo y Valdés, *Historia General y Natural de las Indias, Islas y Tierra-Firme del Mar Océano* (Cotejada con el códice original . . . por D. José Amador de Los Ríos, Madrid, 1851-55 [1st ed. 1535]), vol. 4, p. 121.

19 *Idem*, p. 222.

wood and of cane, with triangular lateen sails and with a rudder at the stern." *(Los yndios del pueblo de Payta, de Puerto Viejo, de Tumbez, y de la ynsula de la Apuna, y los de toda la marina, vssauan de ynmemorable tiempo aca, y el dia de oy lo ussan, de vnas balsas de madera liuiana y seca, y de cañas, con unas velas latinas trianguladas y con un timon en la popa.)*[20]

Other chroniclers, such as Las Casas, Cieza de Leon, Bernabé Cobo, Garcilasso de la Vega, Francisco Xerés, Pascual de Andagoya, Pedro Pizarro, Augustín de Zárate, Pedro Sarmiento de Gamboa, and Miguel Cabello de Balboa, mentioned the sailing rafts, and several of the accounts contain quite detailed descriptions. All, however, fail to tell of the shape of the sails.

OTHER EARLY ACCOUNTS

The earliest known illustration of an Ecuadorian sailing raft is contained in the journal of an Italian, Girolamo Benzoni, who traveled in the New World during the mid-1500's. The picture (Fig. 4, upper) accompanies a description of the Puerto Viejo region, and is captioned "Method of Fishing and Navigating in the South Sea." The rig differs from those described in the Spanish accounts; the small sail is square-cut, and bent to a slender yard supported by an "X"-shaped frame. The drawing is crude and undoubtedly lacks some details of rigging which would be necessary for the proper function of the rig.[21]

In the years 1614 to 1618 Joris van Spilbergen led a fleet of Dutch ships on a voyage around the world, during which he touched at various points along the South American west coast.[22] Contained in his account are two illustrations which provide further evidence for the type of sail and rig used on Peruvian rafts. One of these is included in a panorama of the harbor at Paita (Fig. 4, center). The part of the picture caption referring to the raft reads: ". . . one of the savages' vessels, called *balsem*. Here they have fish aboard, and they can sail swiftly with these vessels in the wind." The placing of the centerboards indicates that the navigation of the raft was identical to that of present-day Sechura rafts. The rig is fore-and-aft, with two loose-footed sails. The set of the sails, together with the evidence of flags flying from the Dutch ships, indicates that the raft is hard on the wind. Each mast is built up of two sections bound together, imparting a curve to the luff of the sail. The sails are made of narrow, diagonally sewn panels

20 Pedro Gutiérrez de Santa Clara, "Historia de las Guerras Civiles del Perú (1544-1548) y de otros sucesos de las Indias" (in *Colección de Libros y Documentos Referentes a la Historia de América*, Madrid, 1905 [Ms. completed before 1603] Tomo tercero, Cap. LXI, pp. 527-528).

21 Girolamo Benzoni, *History of the New World* (Hakluyt Society, no. 21, 1857 [1st ed. 1565: translated by W. H. Smyth from the 2nd Italian ed., Venice, 1572]), p. 243.

22 Joris van Spilbergen, *East and West Indian Mirror* (Hakluyt Society, series 2, no. 18, 1906 [Leiden ed., 1619]).

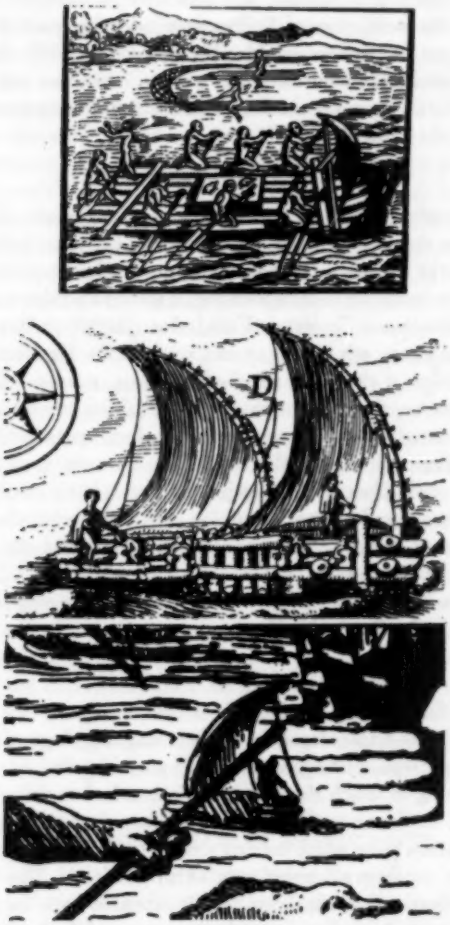


FIG. 4. *Upper:* Benzoni's drawing of a Puerto Viejo raft. *Center:* Detail from Spilbergen's drawing of Paita Harbor. *Lower:* Detail from frontispiece of Spilbergen's journal.

to form a triangular shape. Another raft with a single triangular sail and curved mast appears in the frontispiece of Spilbergen's journal as part of a conglomerate fleet from different parts of the world. (Fig. 4, lower). While the vessels in this picture are not specifically identified, they were in most cases redrawn from illustrations found elsewhere in the account. The small raft corresponds most readily to that shown in the Paita Harbor illustration.

SUMMARY OF EARLY ACCOUNTS

Among the early Spanish accounts, only those of Sámano, Oviedo, and Gutiérrez hold clues to the type of sail used by native raftsmen before Spanish contact. Although the evidence for triangular rather than square sails found in Sámano's *relación* is subject to interpretation, it is soundly substantiated by specific statements of Oviedo and Gutiérrez. *Vela latina* ("latin" or "lateen" sail) refers to the triangular lateen sail known to and used by the Spaniards. In the lateen rig the leading edge of the sail is attached to a long, steeply-inclined yard which has, from a distance, the appearance of an aft-raking curved mast. This spar, however, is supported by one or more relatively short masts in Old World craft. In Spilbergen's illustrations the sail is attached to a curving mast stepped on deck, rather than to a yard. Thus it differs technically from, but is similar in appearance to, the true lateen rig. It is not surprising that the Spaniards referred to the native raft sails as "lateen," since they closely resembled the only triangular fore-and-aft rig known to them.

First evidence for the use of square sails in Ecuador is supplied by Benzoni in his 1565 drawing of a Puerto Viejo raft.

TRIANGULAR SAILS IN ECUADOR

Ecuadorian fishermen of the Manabí coast (the Puerto Viejo region of the early Spaniards) use triangular sails on their seagoing dugout canoes (Plate 2, upper). Although some are rigged with high-peaked gaffs, many still carry the older triangular rig in which the entire luff is attached to the mast. The mast is of two sections, the lower a stiff length of hardwood or *caña de Guayaquil,* the upper a more flexible piece which imparts a curve to the luff of the sail. The cotton panels are sewn in diagonal strips parallel to the leech. The foot of the sail is considerably longer than the hoist, and is extended by a long, slender boom. The entire rig, with the exception of the boom, is strikingly similar to that carried on the Paita raft pictured by Spilbergen.

The possibility seems not too remote that the rig of these Ecuadorian dugouts may be a carry-over from the ancient type, used on both canoes and rafts. Unfortu-

nately, little information on canoe sails is found in the writings of the early chroniclers. Oviedo relates that Pizarro encountered sailing canoes at the Bay of San Mateo in northern Ecuador, but gives no details of rigging.[23]

Square sails are unsuited to narrow-beamed canoes. These craft lack stability for large sail-carrying capacity, and the yard of a square sail adds weight aloft where it is least desired. The triangular sail is much more readily trimmed or slacked for maneuvering or avoiding a knockdown in a sudden puff of wind. On the other hand, a raft gains in the amount of sail it can carry on a mast of the same height if a square sail is used in place of a triangular sail. Also, steering is easier in running and reaching with a square sail. These advantages would be offset by loss of maneuverability and efficiency to windward. These sailor's considerations, in lieu of historical record, offer an explanation as to why the native seamen may have replaced their raft sails with European types soon after seeing Spanish ships, while retaining their own triangular sails on dugout canoes. Benzoni's drawing suggests that some Puerto Viejo sailors began early after Spanish contact to adapt the square sail to their rafts, employing a sheer mast, whereas a half-century or so later triangular sails were still carried on the rafts seen by Spilbergen in Peru. It is not until the late 1600's that square sails are first mentioned in connection with Peruvian rafts at Paita, by Dampier.

Here the historical evidence for aboriginal sail type ends. Although representations of reed-bundle floats abound in Peruvian tapestries and pottery, no pictorial material has been found by archaeology which can be confidently identified as representing sailing rafts. The only tangible evidence for pre-Columbian sailing rafts consists of numerous centerboards found in ancient Peruvian burial sites. These archaeological centerboards and the descriptions of the early chroniclers leave no doubt that Indian mariners of western South America had learned the construction and navigation of centerboard sailing rafts before the coming of the Spaniards. The method of steering and sailing to windward by use of centerboards was new to Europeans, and the fore-and-aft triangular sail was not a European introduction.

WORLD DISTRIBUTION OF SAILING RAFTS

The resort-fishing town of Playas, on the northern shore of the Gulf of Guayaquil is the last outpost of centerboard sailing rafts in Ecuador. Here some fifty or sixty fishermen still go to sea in small craft called *balsillas* (Plates 1, right; 2, center). Two large balsa-wood logs with a smaller log between comprise the hull. The usual length is from twelve to fifteen feet, with a beam of about three

23 Oviedo y Valdés, *op. cit.*, p. 122.

and one-half feet. The logs are tapered and rounded at bow and stern to present an easy entrance and offer less resistance to the water. Near the bow and stern the logs are notched to receive crosspieces fashioned from curved lengths of hardwood. The logs are firmly lashed with rope to the crosspieces, creating a sturdy, light hull. The inner sides of the outside logs are notched to hold the mast step, a hardwood block which supports the heel of the mast. Just aft of this a slot which receives a single centerboard is cut through the center log. The centerboard is a rectangular slab of hardwood with strips on either side of the upper edge to prevent it from sliding downwards out of the slot. A long-loomed, narrow-bladed oar is used for steering and paddling. The cotton sail is gaff-rigged, with a boom and peak halyard. Spars are of hardwood or *caña*. The mast is supported by two sets of shrouds, often of telephone wire, and two after stays which serve as running backstays. These are tied to the outer ends of the crosspieces, which extend slightly outboard from the hull.

Estrada tells us that about fifty years ago *balsillas* at Playas were formed of five untapered logs of even diameters, and carried rectangular fore-and-aft sprit-sails (like the gaff sail, a North American-European type). His drawing shows a single centerboard just aft of the mast, presumably carried between the logs as in the Sechura rafts.[24]

Modernization has resulted in a narrow-beamed craft the sailing qualities of which approach those of the dugout canoes which have all but replaced the rafts in coastal Ecuador. Although rig and hull form have been altered considerably by new ideas, the *balsilla* of Playas, like the raft of Sechura, has its antecedents in the ancient native craft of western South America.

At almost the same latitude as Sechura, but on the opposite side of the South American continent, craft very similar to those of Peru are found in use today. Brazilian fishermen of Pernambuco, Parahyba, and Ceará build single-centerboard sailing rafts, called *jangadas*, for fishing the coastal waters. The light wood of various trees called *pau de jangada* ("raft-wood," species of *Ochroma, Cordia, Apeiba*) is used for the hull. The logs, usually five in number, are fastened by means of hardwood pins and crosspieces. The curving, flexible mast is stepped in a hardwood block on the center log, and gains support from a tabernacle—an open box-shaped structure built up around the base to serve as mast partners. A similar tabernacle seems formerly to have been used in Peru; Captain Morrell described a raft equipped with one at the Lobos Islands (see p. 376). Friederici, in

24 Emilio Estrada, *Balsa and Dugout Navigation in Ecuador* (American Neptune, vol. 15, no. 2, April, 1955), pp. 147-148.

his dictionary of American Indian terms,[25] notes a description of the use of centerboards by Camara in his essay on indigenous craft of Brazil: ". . . conforming to the force of the wind, and the course which they follow in relation to it, they lower and raise them, or pull them out when running before the wind. They also hold them vertically or inclined."[26]

The triangular *jangada* sail, with its diagonally sewn panels and curved mast stepped on deck, bears a striking resemblance to the sails of the Paita rafts pictured by Spilbergen. Modern *jangada* sails are loose-footed, extended by slender booms to which the clews are attached. Nineteenth century illustrations show this rig (Fig. 5, upper) and also one in which the entire foot of the sail is lashed to the boom (Fig. 5, lower). Spilbergen's pictures do not show a boom, and it is not clear how the loose-footed sails were sheeted in.

Further search through the early literature on coastal Brazil is necessary to determine the appearance of the aboriginal craft. If, as Daniel Kidder wrote, the Brazilian *jangada* has been "in constant use since the period of discovery" and "has preserved its aboriginal form and style of construction,"[27] the occurrence of such markedly similar sailing rafts on opposite coasts of the continent in aboriginal times poses interesting questions. By what route, and by whom, was the idea carried across or around the continent? In which region was it first known?

The problem is enhanced by not being confined to the South American continent. Sailing rafts equipped with three centerboards are used in Formosa for lightering cargo and coastal fishing.[28] The centerboards are inserted between the bamboo logs of the raft, and may be shifted about to accomplish the desired trim in relation to the sail. Steering, however, is not by centerboard but by the long-bladed oar common to sampans and other sailing craft of the China Sea. Although the sail type (Chinese matting lugsail) and method of steering differ from those of the Peruvian rafts, the presence of centerboards warrants further investigation, especially as to the occurrence and appearance of these rafts in ancient times. Hornell considered their construction and the use of centerboards so closely related to those of Peruvian rafts as to present questions of distribution and human migration.[29]

25 Georg Friederici, *Amerikanistisches Wörterbuch* (Hamburg, 1947), pp. 280-281.

26 Friederici's reference is to Camara, *Ensaio sobre as construcções navaes indigenas do Brazil* (Rio de Janeiro, 1888). (Author's transl.)

27 Daniel P. Kidder, *Sketches of Residence and Travels in Brazil, embracing historical and geographical notices of the empire and its several provinces* (Philadelphia, 1845), vol. 2, p. 176.

28 Detailed description of the Formosa raft is supplied by G. R. G. Worcester, *Four Small Craft of T'ai-wan* (Mariner's Mirror, vol. 42, no. 4, Nov., 1956).

29 James Hornell, *South American Balsas: the Problem of their Origin* (Mariner's Mirror, vol. 17, 1931).

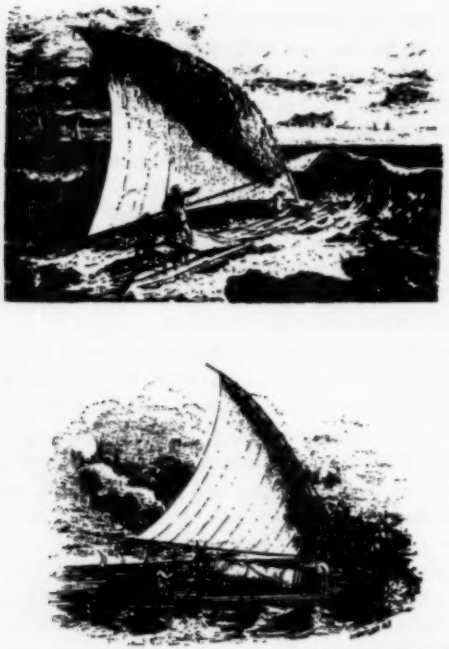


FIG. 5. *Upper:* Brazilian *jangada* (from Franz Keller, *The Amazon and Madeira Rivers*, Philadelphia, 1875). *Lower:* Brazilian *jangada* (from Daniel P. Kidder, see footnote 27).

Several types of sailing rafts are known from the Coromandel Coast of India. At Negapatam large lateen-rigged craft used exclusively in the catching of flying fish carry movable keels; although Hornell reported these as two leeboards and a steering oar,[30] Bowen refers to them as centerboards, and proposes for these rafts a common origin with those of Formosa and South America.[31] He also notes the report of a three-centerboard raft of Indochina, but gives no details other than that it carried a Malayan lugsail.[32]

30 James Hornell, *Water Transport* (Cambridge, 1946), p. 66.

31 Richard LeBaron Bowen, Jr., *Eastern Sail Affinities* (American Neptune, vol. 18, no. 2, April, 1953). See also *Boats of the Indus Civilization* (Mariner's Mirror, vol. 42, no. 4, Nov., 1956).

32 Bowen, *Boats of the Indus Civilization*, p. 288.

PROBLEMS OF ORIGIN

Sailing rafts have become increasingly important in discussions of the movement of people in the Pacific area. Hornell was of the opinion that very early voyages in the Pacific may have been undertaken in rafts rather than in the various types of ocean-going canoes of later times. He proposed an Asiatic origin for centerboard rafts, with subsequent dispersal to South America. Considering the difficulties of a direct west-to-east crossing, he suggested a coastal route around the North Pacific to account for the raft's presence in Peru.[33] Means opposed this view, noting the absence of sailing rafts in the intervening coastal territory.[34] Lothrop had previously considered the problem, apparently favoring invention in South America, but deferred judgment in view of the difficulties presented by the occurrence of centerboard rafts in Formosa.[35] These authors shared the opinion that sailing rafts were incapable of the extensive voyaging necessary to link eastern Polynesia directly with western South America.

Heyerdahl's voyage in the "Kon-Tiki" showed that it is possible to sail a raft from Peru to Polynesia; he used this to bolster his thesis of the peopling of Polynesia from the New World, maintaining that centerboard rafts were invented by inhabitants of ancient Peru. At that time he believed that Peruvian rafts were only capable of drifting voyages with following wind and current, and thus could not have been introduced from Polynesia.[36] Through experiments at Playas with a raft patterned after that illustrated by Juan and Ulloa, he has later concluded that such a craft can reach a windward destination as well.[37]

Haddon and Hornell, in their monograph on the canoes and other craft of Oceania, show the distribution of a sail-type called the "Oceanic spritsail."[38] It ranges through eastern Polynesia from Hawaii to the Society Islands, including the Marquesas, and extends to New Zealand. Sails of this type were carried on rafts as well as on canoes. Bowen has made a case for the origin of this sail type in Indonesian and Indian waters, with subsequent dispersal eastward into the Pacific. Noting the similarity of the Oceanic spritsail to the sails illustrated by Spilbergen in his drawing of the raft at Paita, Bowen concluded that Polynesians brought knowledge of this triangular sail and the centerboard rafts to ancient Peru. He cites the resemblance of Brazilian *jangada* sails as additional proof of

33 Hornell, *South American Balsas*, p. 355.

34 Means, *Pre-Spanish Navigation*, p. 20.

35 Lothrop, *Aboriginal Navigation*, pp. 237, 253.

36 Heyerdahl, *American Indians in the Pacific*, pp. 513-620.

37 Heyerdahl, *Guara Sailing Technique*, p. 340.

38 A. C. Haddon and James Hornell, *Canoes of Oceania* (Bernice P. Bishop Museum, Special Publications, nos. 27-29, Honolulu, 1936-38).

the theory.[39] We have seen that modern Ecuadorian seagoing canoes carry sails strongly resembling those of the ancient rafts. A sail carried on a Cayapa Indian canoe from the Cojimíes region of Ecuador (Plate 2, lower) is practically identical in appearance to the Oceanic spritsail described by Haddon and Hornell and discussed by Bowen.

The presence of centerboards in Asian and American sailing rafts and the affinities between Oceanic and ancient Peruvian sails show the magnitude of the problem of original home. Earliest evidence for sailing rafts in Peru is from archaeological sites at Paracas and Ica, tentatively dated at about 1000 AD, in which centerboards have been found as grave goods. The age of centerboard sailing rafts in India, Formosa, Indochina, and Brazil has not yet been determined. We can safely assume, however, that we are dealing with a problem of dispersal in pre-European times. Where the rafts occur today, they are but remnants of a former more widespread distribution, persisting in situations where isolation, local poverty, or resistance to modern ways have resulted in their retention.

SUMMARY AND CONCLUSIONS

Although thought to be extinct, the centerboard sailing raft of western South America still exists today. Sailing rafts of the Sechura coast retain the essential characteristics, except for sail type, of the ancient craft. The ancient technique of centerboard navigation also persists. The sails carried by pre-Columbian rafts were triangular, fore-and-aft rigged, and set on curving masts stepped on deck. This sail type may be represented today in dugout canoe sails of the Ecuadorian coast and Brazilian *jangada* sails. Affinities between ancient Peruvian sails and those of eastern Polynesia have been suggested. The aboriginal type was replaced on rafts of Ecuador and Peru by square sails rigged in the European manner, as the result of foreign influence in post-conquest times. In comparatively modern times the lug rig has taken over in Peru, while Ecuadorian rafts are gaff-rigged.

The accounts of experienced seafaring men of the past three centuries and observations of the sailing qualities of the Sechura rafts have led to the conclusion that large centerboard sailing rafts were capable of long distance voyaging, and were not inherently limited as to direction by geographical factors of wind and current. Final proof of windward capability is manifest in the Sechura rafts, employing the ancient method of centerboard navigation.

No agreement has been reached as to place of original invention of centerboard sailing rafts, and no evidence has yet been found to indicate that any of the regions where they occur today was their original home. The problem of local

39 Bowen, *Eastern Sail Affinities*, pp. 88-91.

invention in western South America versus introduction from the Pacific Islands is linked intricately with that of direction of contact between ancient Peruvians and the inhabitants of Oceania.

The establishment of the aboriginal sails of western South America as triangular, through the evidence of the early Spanish chroniclers, confirms the validity of Spilbergen's representation of them, and thus lends support to the notion of affinities between ancient Peruvian sails and Oceanic spritsails of eastern Polynesia. These affinities strengthen the possibility of direct pre-Columbian contact across the great expanse of ocean between these two regions.

Investigators of Pacific area culture history have compiled an impressive list of artifacts and culture traits the distribution of which can only be explained in terms of carriage by man. The rather complicated notion of a raft navigated by sail and centerboards is an important addition to this list, since any explanation for dispersal of objects and ideas across the sea must include means of transport. The story of the diffusion of sailing rafts may play an important role in the solution of these problems. We may also find, through further examination of the history of these rafts, that we have underrated the capability of ancient seafaring folk to make long voyages in such primitive craft.

University of California
Berkeley, California

SOME PUBLICATIONS

OF THE

UNIVERSITY OF NEW MEXICO AND THE LABORATORY OF ANTHROPOLOGY

¶ *For the following address orders to the University of New Mexico Press Albuquerque, New Mexico*

University of New Mexico Bulletin, Anthropological Series

FLORENCE M. HAWLEY Field Manual of Prehistoric Southwestern Pottery Types (Vol. 1, no. 4, 1936. 126 pp., map, table [revised 1950]) ..... $ 1.00

[DONALD D. BRAND, ED.] Symposium on Prehistoric Agriculture (Vol. 1, no. 5, 1936. 72 pp., 6 figs.) 1.00

MORRIS EDWARD OPLER The Character and Derivation of the Jicarilla Holiness Rite (Vol. 4, no. 3, 1943. 98 pp., plates) 1.00

University of New Mexico Publications in Anthropology

HARRY HOIJER Navaho Phonology (No. 1, 1945. 60 pp.) 1.00

LESLIE SPIER Comparative Vocabularies and Parallel Texts in Two Yuman Languages of Arizona (No. 2, 1946. 150 pp.) 2.00

KATHERINE SPENCER Reflection of Social Life in the Navaho Origin Myth (No. 3, 1947. 140 pp.) 2.00

NORMAN B. GABEL A Comparative Rachel Study of the Papago (No. 4, 1949. 96 pp., 9 plates) 1.50

ROBERT H. LISTER Excavations at Cojumatlán, Michoacán, Mexico (No. 5, 1949. 106 pp., 36 figs., 4 plates) 1.50

JEAN B. JOHNSON The Opata: an Inland Tribe of Sonora (No. 6, 1950. 30 pp., 3 plates) 1.00

LELAND C. WYMAN The Sandpaintings of the Kayenta Navaho (No. 7, 1952. 120 pp., 49 figs.) 1.75

DAVID F. ABERLE The Kinship System of the Kalmuk Mongols (No. 8, 1953. 48 pp., 3 diagrams) 1.00

CHARLES R. KAUT The Western Apache Clan System: its Origin and Development (No. 9, 1957, 99 pp., 13 figs.) 2.00

University of New Mexico Press Publications

EDWARD F. CASTETTER AND WILLIS H. BELL *Pima and Papago Indian Agriculture* 1942. 245 pp., 5 figs., map) 3.50

EMIL W. HAURY [AND COLLABORATORS] *The Stratigraphy and Archaeology of Ventana Cave, Arizona* (1950. xxvii + 599 pp., 66 plates, 118 figs., 65 tables. Published jointly with University of Arizona Press) 15.00

EDWARD F. CASTETTER AND WILLIS H. BELL *Yuman Indian Agriculture* (1951. 286 pp., 5 maps, 1 fig., 2 plates) 4.00

¶ *For the following address orders to the Laboratory of Anthropology Post Office Box 1727, Santa Fé, New Mexico*

Technical Series Bulletin

H. P. MERA A Proposed Revision of the Rio Grande Glaze Paint Sequence (No. 3, 1933. 11 pp., figs.) 1.00

H. P. MERA Population Changes in the Rio Grande Glaze-Paint Area (No. 9, 1940. 41 pp., 29 maps) 2.00

J. D. JENNESS A Variation of Southwestern Pueblo Culture. Gilmore Nitenahoi Analysis of the Skeletal Material (No. 10, 1940. 20 pp., 3 plates, 12 figs., 4 maps, 2 charts) 1.25